

DIGITAL DIGEST

Vol. 4 No. 2

Devoted to Amateur Digital Communications & Technology

March/April, 1991

In This Issue...

The DIGIPEATER...

features news, software and product reviews...

PACKET...

Lynn Taylor, WB6UUT
takes a look at your TNC and the HOST mode...

DATACOM...

Norman Sternberg, W2JUP
gives his Parable on the Marks and the Spaces...

DSP...

Jonathan L. Mayo, KR3T
reviews the DSP-12 from L.L. Grace Company...

BITS & BYTES...

Lacy McCall, AC4X
gives a few points to ponder, while perhaps, taking a walk...

DIGITAL QRP...

Rich Arland, K7YHA
reviews three software packages of which should be of particular interest to QRP DXers...

The AMIGA CORNER...

Ben Williams, AA7AS
discusses the latest happenings in the world of the Commodore/Amiga...

COMPUTERS...

Jonathan L. Mayo, KR3T
discusses the "how-to's" of portable, digital short wave listening...

LANLINK APPLICATION NOTES...

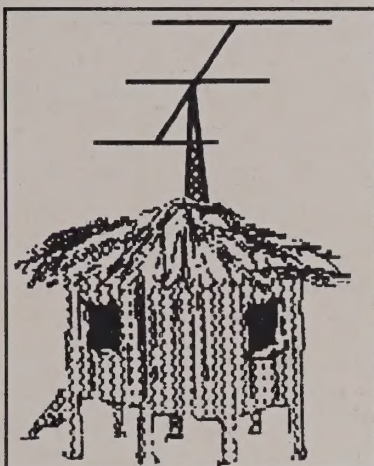
Joe Kasser, G3ZCZ
discusses the use of LanLink for binary file transfers via packet...

IBM ARENA...

Jonathan L. Mayo, KR3T
discusses the laptop computer and some purchase considerations...

MacHAM WORLD...

Stan Horzempa, WA1LOU
discusses the "Mother of All Ham Radio Software Bargains..."



Coral Draw 2.0. Coral is a fantastic graphics program that really shines in text manipulation.

From The Publisher's Shack

Late Again! There's not really much to do in belaboring the point that the last few issues of DD have been habitually late. Time, or the lack thereof, has been the major culprit. We've begun a few things to help streamline getting the Digest to press, which are evident with this issue. Now, the Digest is completely computer generated on a new Postscript® printer. In the past, we have been combining a bit of hand cut and paste along with standard photo-typesetting and halftoning from our trusty old VariTyper and VGC camera to produce the Digest.

Now, virtually every phase of production is computerized. In addition to the new printer, we purchased one of the new Logitech 256 gray-scale hand scanners for inputting photos directly into the Digest. The new masthead was created using

Hopefully these measures will help in turning out the Digest in a bit faster fashion and still maintain a decent level of quality. It won't do anything for scheduled articles which sometimes drift into our office a little past deadline, but it will speed things up once all the material is in hand. Again, it all gets back to the time factor, which is becoming a most precious commodity. Realizing that the Digest, for all involved in its production and publication is a secondary endeavor since most, if not all of us, put in well over the 40 hour day work week in our respective, full-time careers. For me, a 40-hour work week would be a luxury. Or, maybe it wouldn't. I probably would get bored. For those of you who don't know, my full-time job is running an advertising agency. And anyone who is involved in the ad business, knows that it is no 9-5 job. I think this runs true in any job or profession where you strive to be the best at what you do.

It takes pride, determination, hard work, and not being a persistent clock watcher in order to succeed and be the best we can be. Such it is with Digital Digest. It has been with pride and determination that the Digest gets published every other month, and *oops*, perhaps not watching the clock that has caused a few missed deadlines. But with hard work, and continued determination... we'll keep trying to do better!

'til next issue... 73, Tom / WA8DXD

DIGITAL DIGEST

Devoted entirely to Digital Communications & Technology
4063 N. Goldenrod Road • Winter Park, FL 32792
Postmaster: Return Postage Guaranteed

BULK RATE
U.S. POSTAGE
PAID
Permit No. 2449
Orlando, FL

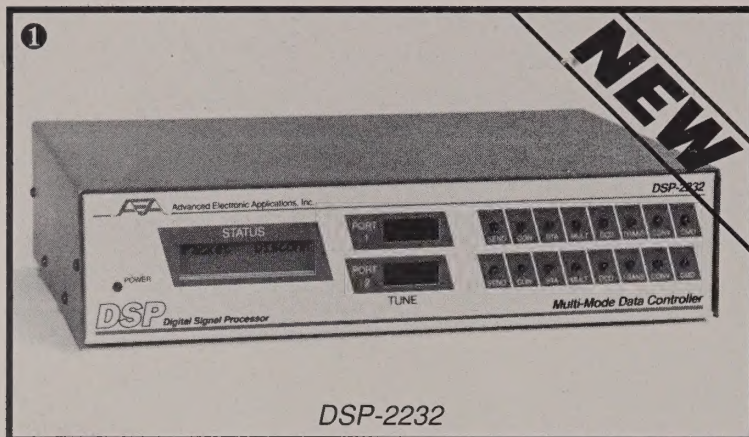
Randall Klint / 91-2
44 Ward Circle
Brunswick, ME 04011

high-quality

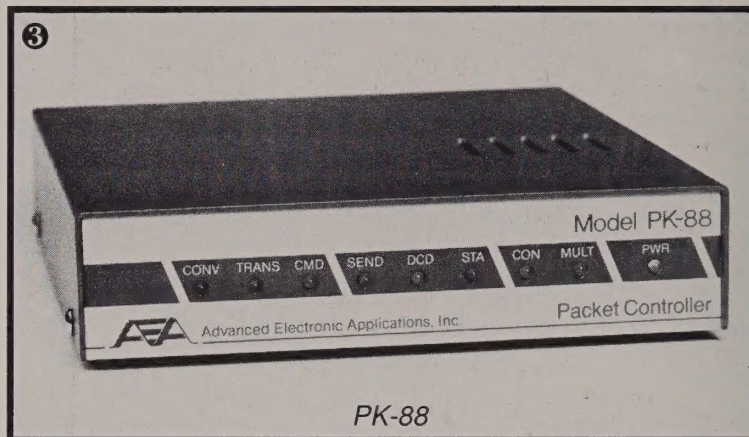


low-cost

Digital Data Products



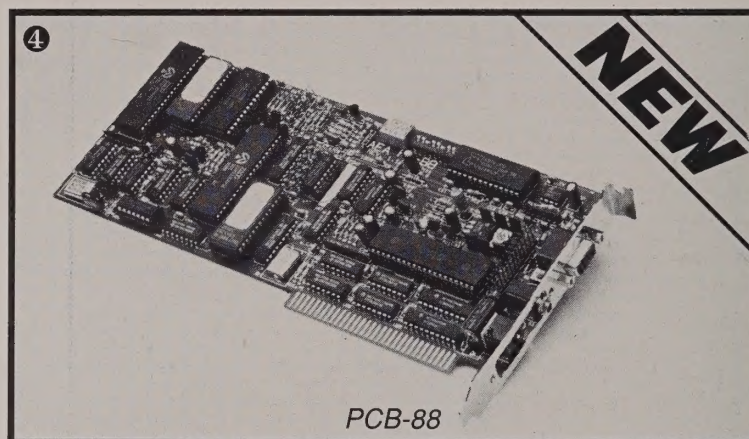
DSP-2232



PK-88



PK-232MBX



PCB-88

① **NEW! DSP-2232 (pictured) and DSP-1232:** state-of-the-art controllers utilizing digital signal processing technology with the Motorola 56001 processor; built-in software modems include all standard FSK modems, G3RUH/K9NG 9600 bps modem, 400 and 1200 bps PSK telemetry modems for PACSAT and OSCAR 13 & 15 satellites, AEA's V.26b 2400 bps DPSK modem and more; modems for SSTV, multi-level grey scale WEFAK and WEFAK APT coming soon; includes all features of the PK-232 and much more; dedicated parallel printer port; DSP-2232 has two simultaneous radio ports and a front panel LCD display; DSP-1232 has two switchable radio ports (no LCD display) and can be upgraded to the 2232 at any time **DSP-1232 \$789.00**
..... **DSP-2232 \$999.95**
..... **DSP-1232 UPGRADE KIT \$299.95**

② **PK-232MBX Multi-mode Data Controller:** most popular multi-mode controller ever made; RS-232 compatible controller for Packet, Baudot and ASCII RTTY, AMTOR/SITOR ARQ and FEC, Morse code and WEFAK; also receives NAVTEX/AMTEX and TDM; superior Chebyshev filter design for better copy; built-in 18K byte PakMail™ personal packet maildrop with auto forwarding; SIAM™ for automatic RTTY signal identification; KISS mode for TCP/IP compatibility; Host Mode for user-friendly software interface; cables and connectors included **\$349.95**

③ **PK-88 Packet Controller:** the easiest way to get started with amateur digital communications; same packet commands as the PK-232; includes Host Mode and 18K byte Packet maildrop; AX.25/L2/V2 compatible; requires 12 – 16V DC @ 500 mA (not included); advanced features such as KISS mode and NET/ROM compatibility for the advanced user, easy to learn for the new user **\$119.95**

④ **NEW! PCB-88 IBM Compatible Plug-In Packet Adapter:** full-featured Packet controller; plugs into 8-bit expansion slot in your IBM PC, XT, AT or compatible; includes all features of PK-88 controller and more; packet-only version of PC-Pakratt II (called PC-Pakratt-88) terminal control software included at no additional charge; external 12V DC input (power supply not included) so your unattended TNC and mailbox can operate with the computer turned off; true packet DCD sensing circuit included; built-in modem disconnect header **\$169.95**

Specifications are subject to change without notice or obligation. Prices listed are suggested Amateur Net through participating AEA authorized dealers (DSP upgrade kit available through the factory).

Technical support may be obtained through CompuServe's Hamnet forum. Messages should be addressed to user ID #76702,1013.

Advanced Electronic Applications, Inc.

P.O. Box C2160/2006 196th St. S.W. Lynnwood, WA 98036-0918

Technical Support & Sales: (206) 775-7373 Fax: (206) 775-2340

© Copyright 1991 by AEA, Inc. All Rights Reserved.



Free QSL Mailing Service . . .

We received an interesting press release from Pat Flynn, N7PQL announcing his free QSL mailing service for USA amateur radio operators called the QSL POST OFFICE. They will mail any USA or Canadian destination QSL cards first class for Canadian QSL cards to any U.S. destination) post-free to the sending ham. To register with the QSL POST OFFICE, interested hams should send a 29@ #IO SASE to PO Box 28055, Lakewood, CO 80228, (Tel. 303/763-9046) and complete details will be mailed immediately. The service is apparently paid for by advertisers to the Ham Radio Bulletin which is enclosed along with the outgoing QSLs.

Source: W5YI Report

HIGH-TECH NOMAD . . .

is the title of an article appearing in the March/April issue of THE FUTURIST, journal of the American Future Society, featuring Steve Roberts, N4RVE. The American Future Society is an organization which delights in looking toward what life will be like many years from now. (Hopefully it won't be the life that Roberts leads!) The story tells how hacker/tinkerer Steve Roberts gave up his high-tech position and bought a recumbent (reclining) bicycle several years ago and took to the highways. But unlike other nomads, he never severed his ties with high technology.

Instead he designed "a mind-boggling computerized and pedal-powered bicycle." The latest version of his 350-pound bike (called The Winnebiko) sports a cellular phone, a FAX machine, several ham radios, a solar power Panel, and seven on-board computers" - if you can believe that!

I saw a previous version of Steve's bicycle a couple of years ago when he had a booth at the Dayton HamVention. It is absolutely unbelievable. At first I thought he was a nut, but after chatting to him, I realized he was an absolute genius - although perhaps mis-guided!

His new bike is 8-foot long and has 54 speeds! Behind the bike is a 4-foot yellow trailer with a solar lid, a flip-down communications bay access door and numerous antennas. The computers are now Macintosh and Toshiba.

His ham radios are an ICOM 2-meter radio that was repackaged and built into the console - an ICOM 725 is mounted in the trailer. He also sports Yaesu 290 and 790 multimode VHF/UHF rigs in the trailer as well. He can even work the satellites from his bike! A small color TV transceiver from AEA allows him to work the growing community of amateur TV stations.

The bicycle (he calls it the "Behemoth" - for Big Electronic Human-Energized Machine) carries extensive camping and life-support gear, including medical supplies, emergency food stocks, a filtration system for wild water, emergency flares, basic weaponry, camp cooking equipment, harsh weather clothing... a custom tent. Roberts continues to do computer research, write books, and even puts out a professional magazine on his exploits, all while peddling down the highways on his bicycle! It is done by pressing different combinations of keys on his handlebars to produce the desired letter of the alphabet.

Roberts wrote "Computing Across America" while pedalling 16,000 miles across the U.S! It was this book that he was selling at Dayton when I met him. His first on-board computer in 1983 was a Radio Shack Model 100 powered by a 5-watt solar panel.

He now has nearly 130 corporate sponsors (including Apple Computer, Atari, Hewlett-Packard and General Electric) who have chosen to financially support his adventures down the highway.

He is getting ready to hit the road again ... pedalling across the United States. He has the only bicycle that I have heard of that has MCI-Mail, packet radio, a cellular phone, ATV, and global telecommunications capability. He will be heading out again starting in July.

There is no telling what his newest bicycle is worth ... one estimate was \$1 million dollars - all designed and built by Steve Roberts, N5RVE. It took him nearly 3 years to build, but it will never be completed. He just keeps adding to it! "The Futurist" article closes with "Ultimately Robert's dream is to make possible a whole community of high-tech nomads who will live and work while travelling constantly. Given his past successes in inspiring people and in demonstrating the possibilities of this unique lifestyle, such a nomadic community might not be so far down the road." (N4RVE, P.O. Box 2390, Santa Cruz, CA 95063)

Source: W5YI Report

F.B. Morse 200th Anniversary . . .

Many special operating activities are planned for the 200th anniversary of the birth of Samuel F.B. Morse, inventor of the Morse telegraph and its associated code. Morse was born on April 27, 1791. The activities are being planned by Morsum Magnificat, a Morse enthusiast publication out of England.

Source: W5YI Report

EVELYN GARRISON & ASSOCIATES . . .

is the name of the new manufacturers' representative firm being founded by the most respected woman in the amateur radio industry. Mrs. Garrison, who holds the amateur callsign WS7A, has tendered her resignation as marketing manager for Icom America, Incorporated where she has served for the past 16 years. In her tenure with Icom she has brought the company into the #1 sales position domestically and has helped to develop marketing strategies worldwide. When she moves to her own company on April 1st, she will not leave Icom entirely. The company has decided that rather than replacing her, to award her a contract to continue to represent the domestic sales of its product line in the United States and Canada. In addition to Icom, Mrs. Garrison will be the marketing representative for such well known product lines as Advanced Electronic Applications and Valor Antennas. The offices of Evelyn Garrison & Associates are located at 21704 S.E. 35 Street, Issaquah, WA 98027; Phone (206) 557-9611, fax (206) 557-9612.

Source: Westlink Report / 3-20-91

Computer Compatibility Article . . .

The April 1991 edition of ComputerCraft (formerly Modern Electronics magazine) has an excellent article in it on IBM computer compatibility. It is the system ROM (Read-Only Memory) BIOS (Basic Input/Output System) microchip that plays the key role in determining IBM compatibility.

Early clones simply used exact copies of IBM's PC BIOS to insure compatibility. The courts and copyright infringement put an end to this practice. This led to the development of several non-infringing BIOS by such companies as Phoenix Technologies, Award Software and American Megatrends.

It is possible to plug in another replacement BIOS chip depending on the error message you get when running specific IBM compatible software. New BIOS's cost anywhere from \$25 to about \$95 each.

Source: W5YI Report

If you have news and information of interest to the digital amateur radio community, please be sure to let us know!



Your TNC & Host Mode

In several past articles I've mentioned the importance of buying a TNC which has a host mode, and I've also talked at length with people who say "Yeah, I've gotta try host mode" which leads me to believe that this particular feature is not well understood.

Host mode is currently standard on the AEA PK-88 and PK-232, the Heath HK-232, the Kantronics TNCs and coming soon on several other TNCs. Some of the best software written for use in packet radio is designed to use the host mode, such as Packet-GOLD for use with the AEA units.

Host mode is a computer-to-computer interface. Those who are used to the "human mode" now will find host mode difficult, if not impossible to use directly. Much like the protocol used over the air, host mode uses a "frame" which tells precisely what information is following, and where it's coming from.

Host mode basics:

For our example, I'll be describing the host mode on the AEA TNCs. More information on this mode can be found in the PK-232 Technical Reference manual. Numbers starting with a dollar sign (\$) are hexadecimal, or base 16.

Host mode frames start with the character SOH (Start of header, Control-A or \$01), followed by a control byte, then data, and finally, the ETB character (End of Transmission block, Control-W or \$17). To allow binary data, if an SOH or ETB occur in the middle of a data frame, the DLE character (Data Link Escape, Control-P or \$10) is sent, followed by the SOH or ETB. Of course, this means that if a DLE occurs, it must also be "quoted" by a DLE.

The control byte is broken into two pieces, with the low order 4 bits carrying the channel number, and the high order 4 bits the meaning or purpose of the following data. As an example, if someone connected to you on channel 4 types "*** DISCONNECTED" and sends it to you, the control byte would be \$34. If the person on channel 4 disconnects, the control byte would be \$54. Host mode software running on your computer can easily tell the difference between the disconnect message from the TNC (which is a change in status), and data sent over the air (which should be displayed).

Not only can frames be distinguished by type, but by channel. Text or other information from the station on channel 4 is easily separated

from text from the station on channel 3. If the incoming frame has a control byte of \$33, it came from channel 3, while a control byte of \$34 is information from channel 4.

The host computer can then use the channel number to display different channels in different colors, or to route incoming information to different "screens" or "buffers." By using separate buffers for each channel, Packet-GOLD displays one connect on screen at a time. When the Packet-GOLD user presses F4, the current connect is replaced completely by the text from the "next" connect.

Most packet operators say that multiple connect operation is difficult or impossible. Many Packet-GOLD users routinely have three or four connects going at a time. Since only one connect is on screen at a time, it is very easy to keep track of who you are talking to at any given time.

Monitored packets are sent from the TNC with a control byte of \$3F, allowing them to be easily separated from connected data and displayed on their own screen while you are connected. If you are really interested in the details of packet radio, this allows you to watch the channel and see why your throughput just dropped dramatically (because someone is on the local BBS, or is transferring a file).

Commands and data:

Because the frame protocol runs both ways, the TNC can tell the difference between commands from the computer to the TNC (Control \$2x) and data to be sent over the air (Control \$4x).

Data to be sent on channel 2 starts with a control byte of \$22, while a command (such as a connect or disconnect) would start with \$42. Commands which apply to all channels are sent to \$4F.

Host mode commands are always sent as two characters, for example the connect command is always "CO." It is up to the software to translate its user commands to the appropriate TNC commands.

Since commands and data may be sent intermixed, it is not necessary to switch the TNC from converse to command mode and back, eliminating the common mistake of sending commands over the air, or the "what?" which you get from command mode when you think you're in converse.

In addition, the TNC response to the "CO" command includes link information not normally available, including the number of pending packets, and the number of retries. Packet-GOLD displays this information in a banner at the top of the screen, along with the connected station callsign and the operator's name. The link state (connected, pending, ready, etc.) is also displayed.

Polling:

Optionally, many host modes can operate in a "polled" mode. The TNC only sends received data when the program asks. Thus, complex functions can allow the TNC to "buffer up" received frames while the computer is busy, then get them from the TNC when the function is completed.

Other modes:

On the PK-232, host mode is available in every TNC mode. This is particularly useful in AMTOR where the link state can be displayed (Traffic, Idle, Error, etc.) much like the displayed state in packet.

KISS mode:

Of course, much of this is possible (at least for packet) through KISS (Keep It Simple, Stupid) mode. In KISS mode, the TNC receives already-built AX.25 frames from the host computer, and transfers received data to the computer with very little processing. The TNC is used to convert asynchronous serial data from the TNC to synchronous data sent over the air, and holds data to be sent until the channel is clear. If a packet is not acknowledged in time, it is up to the computer to send the packet to the TNC again.

There are three disadvantages to KISS mode: first, it is up to the computer software to handle the AX.25 details, which means the TNC cannot be left on its own for any length of time: packet processing must be continuous. Since KISS disables the "smarts" in the TNC, features such as the popular "maildrop" must be disabled, at least during KISS operation. Currently available KISS software requires a computer to be left on all the time if a continuous presence on packet is required.

Host mode leaves all of the TNC features intact, and the TNC can be left on by itself.

Getting it on the air:

Actually using host mode is usually no more difficult than getting the right program and loading it on to your computer. All of the host mode details are handled by the software and many tasks which are now tedious are completely automated.



If you have an AEA TNC and want to see what host mode is about, a "test drive" version of Packet-GOLD is available in the HAMNET section of CompuServe, or you can contact Interflex Systems Design at (714) 496-6639.

Survey:

Last issue I asked a number of questions, and this time I'd really like to get your feedback on a couple of items now that it's had some time to sink in.

9600 baud (and higher):

In the local area, there is a group which is dedicated to bringing faster speeds to amateur packet. This group is pretty much dominated by those interested in TCP/IP, and much of the mail on the BBS network sounds like "high speed packet" and TCP/IP are pretty much inseparable.

Those of you who have been reading along know I'm not a TCP/IP fan, and that I'm very interested in fast packet. What do you think? Is fast packet only for those running TCP/IP, or is it of benefit to those of us running other protocols, file transfers in general, and for keyboard-to-keyboard operators simply as a way to reduce congestion?

The "business" of amateur radio:

Everyone who checks into their local BBS is probably aware of recent messages about the citations issued to several east coast systems.

The message in question raised several questions about Operation Desert Storm, and gave a 900 number to call to express your opinion. Since the folks running the 900 number clearly make a profit from every call, the message is quite likely a violation of FCC rules.

An earlier section in the rules specifically allows stations under automatic control to "retransmit" third party traffic if that station is running AX.25. It further states that the originator of the message is responsible for the message content.

The key word here is "retransmit" -- and a fairly thorough search of the regulations (especially 97.3) does not include a definition of this term. Does it mean retransmit immediately, as with network nodes and digipeaters, or does it include forwarding between bulletin boards?

This issue has far reaching implications, and I'm this one will go beyond the rulings of the FCC Engineers in a single regional office.

As always, your comments are appreciated. Feel free to write to me at the address above, or through CompuServe at 74176,52. Packet mail can be directed to WB6UUT @ KB6GFT.#SOCA.CA.USA.NA. Please avoid topics which may be considered "business" in your packet messages. □

R. L. DRAKE . . .

long gone from the amateur and SWL markets for the greener pastures of home TVRO, is reportedly about to re-enter the shortwave market. Reportedly, Drake will introduce a new "R8" shortwave receiver at the Dayton Hamvention in late April. While not a household name to newer hams, just a decade ago Drake equipment was considered to be among the world's finest in amateur and shortwave gear. From the original Drake 2, 2A and 2B amateur receivers; the TR-3, TR4 and TR-7 HF transceivers; the TR-6 six meter SSB transceiver (a radio that still commands a far higher dollar in resale than it originally sold for) and its line of 2 meter gear - including the Marker Luxury and TR-22 series of 2 meter FM transceivers that are credited with helping to put 2 meter FM into the hands of the average amateur - the name Drake has always been synonymous with the highest quality standards. The company's new R8 shortwave receiver will feature synchronous selectable sidebands, five filters yielding selectivity of .5, 1.8, 2.3, 4 and 6 kHz, frequency coverage of 1 - 30 MHz, better than 100 db dynamic range, a price tag of under \$1,000 and, more important to many, a label marked "Made in the United States of America." It is not known if an amateur transceiver will follow the R8 receiver, but a TR-8 would be welcome by many. (tnx EEB)

Source: Westlink Report - 3/29/91

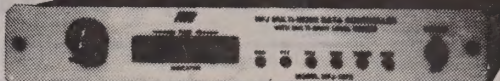


NEED A LAPTOP PC-COMPATIBLE . . .

at an affordable price? Damark's latest liquidation lists several good buys including a unit from Bondwell Computers that features twin 3.5 inch 720 kilobyte loppies, 640K RAM, a removable and rechargeable ni-cad battery pack with charger, AC adapter, Centronics parallel port, serial port, 10.5 inch non-glare LCD screen and more for \$499.99 plus shipping and handling. Other machines listed include a TRC 286 laptop for \$1599.99, a Smith-Corona laptop word processor for \$499.99, a Sharp 10 MHz / 8088 laptop for \$599.99 and a full size 386/W MHz system with VGA color monitor from KLH for \$1999.99. Accessories such as dot matrix and laser printers, mice (no, not mice) and modems are equally discounted. For a copy of the latest catalog, write Damark, Inc., 7101 Winnetka Ave. North, P.O. Box 29900, Minneapolis, MN 55429-0900.

Source: Westlink Report - 3/29/91

MFJ Multi-mode



9 modes for only . . . \$279.95

Using the latest advances, MFJ brings you 9 exciting digital modes and keeps on bringing you state-of-the-art advances.

You get tons of features other multi-modes just don't have.

Only MFJ gives you all 9 modes

You get 9 fun modes -- Packet, AMTOR, RTTY, ASCII, CW, WeFAX, SSTV, Navtex and Contest Memory Keyer.

You can't get all 9 modes in any other multi-mode at any price. Nobody gives you modes the MFJ-1278 doesn't have.

New Easy Mail™ Personal Mailbox

You get MFJ's new Easy Mail™ Mailbox with soft-partitioned memory so you and your buddies can leave messages for each other 24 hours a day.

20 LED Precision Tuning Indicator

MFJ's unequaled tuning indicator makes it easy to work HF packet stations.

You use it the same way for all modes -- not different for each mode.

Multi-Gray Level FAX/SSTV Modem

You'll enjoy natural looking pictures that multiple gray levels can give you.

New Anti-collision technology

MFJ's new Anti-collision technology gets packets through faster, more reliably.

How? Automatic random transmit delays prevent packet collisions.

Plus more . . .

Plus you get . . . 32K RAM, free AC power supply, KISS, true DCD, free eeprom upgrade, random code generator, independent printer port, lithium battery backup, RS-232 and TTL serial ports, standard 850 Hz RTTY shift, socketed ICs, tune command, automatic serial numbering, programmable message memories, dual radio ports and more -- all in a sleek 9 1/2 x 9 1/2 x 1 1/2 inch cabinet.

MFJ Packet Radio



MFJ-1274

\$159.95

MFJ-1270B

\$139.95

MFJ-1270B super clone of TAPR's TNC-2 give you more features than any other packet controller -- for \$139.95.

You can operate both VHF and HF packet because you get high performance switchable VHF/HF modems.

You get Easy Mail™ Personal Mailbox, FAX reception, KISS, Net Rom compatibility, 32K RAM, AC power supply, one year unconditional guarantee and more.

For dependable HF packet tuning, the MFJ-1274 gives you a tuning indicator that's accurate to within 10 Hz -- and it's only \$20 more. Add \$5 shipping/handling.

Nearest Dealer/Orders: 800-647-1800

MFJ MFJ ENTERPRISES, INC.
Box 494, Miss. State MS 39762
601-323-5869; TELEX: 534590
FAX: 601-323-6551; include s/h

MFJ . . . making quality affordable



The Parable of the Marks and Spaces

Tonight's lesson is from the First Book of Deviation. We will read the Parable of the Marks and Spaces.

One night as I maintained my shepherd's pastoral watch over a local digipeater channel flock, my ear was caught by the tweedle-tweedle sound of the Marks and Spaces. I looked to see what bytes were there, and lo! there were no bytes! Only scars and ugly distortions upon the screen and upon the scrolls of parchment that from my printer flew.

I consulted the Oracle, lit two LEDs for candles, and the Oracle spake unto me saying, "Clod, there are not true Marks and Spaces upon thy channel! These are are unclean and must be scourged from thy screen and from thy page! Seek them out, and destroy them, for they are from another world and must be cleansed!"

So as the Oracle bade me, I went forth with sword and screen and sought the unclean bits and Marks and Spaces. And, lo!! I did find them down a mere 15 KHz, issuing forth from another digipeater, full of sound and fury, and of great and fulsome volume. So I did cause these unclean Marks and Spaces to appear as if by magic upon the screen and scroll of my Tabernacle, wherein I did examine them. And true as spake the Oracle, they were indeed unclean and full of the Sores and Blemishes that are called Squared Waves.

And after invoking the Oracle once again, I did see that these unclean Marks and Spaces were from the western shores, from the house of a friend newly come unto these digital modes. And I went unto this friend and said, "Friend, whyfor art thy Marks and Spaces unclean, and of a fulsome noise, and a plague upon our channel?" And my friend spake unto me sayin, "Forgive me, oh Master, I know not what I have done. I am newly come unto this digital mode and am as a stranger in a strange land. Anoint me with thy wisdom so that I may be cleansed and find love once more in the hearts of my fellow hams."

And I said unto the newcomer, "Newcomer, kneel and learn. I will tell thee of the Rule of Carson, a Great Sage from the Laboratories of Bell. Hear! Oh Novice, how it is meet upon you to look to thy "Modulation Index." For thy sidebands doth appear upon a channel in the East, and the peasants are wroth with thee! Thou are truly a deviant soul, guilty of making great noises upon the air, and thy Marks and thy Spaces do grow and infect the adjacent channel - which is not cool!"

And the newcomer knelt in shame and begged forgiveness. He said, "Tell me of this Rule of Carson from the Laboratories of Bell, so that I may cleanse my act and get with the program ere they cast me out as an unbeliever and an infidel."

And I spake unto the newcomer saying, "Oh ye of little smarts! Get thee to a textbook having within it the Rules of the Indices of Modulation. For therein lies the secret of The Rule of Carson: 'A general rule first stated by J.R. Carson in an unpublished memorandum at Bell Labs dated August 28, 1929 is that the minimum bandwidth required for an angle modulation signal is equal to two times (the sum of the peak deviation and twice the highest modulating frequency) to be transmitted.' In the notation defined as:

$$BW = 2(\Delta F + (2F \text{ sub-M}))$$

where BW = bandwidth
 ΔF = peak deviation
F sub-M = modulating frequency."

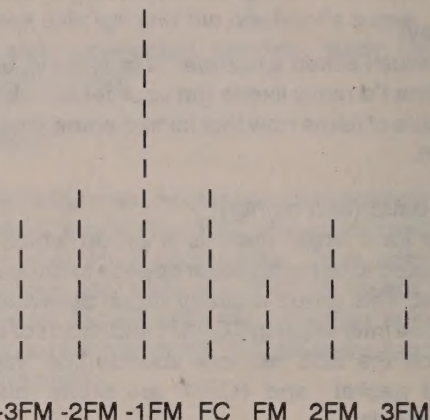
Therefore, it is writ: If the deviation is 5 KHz, and thy modulating frequency is 2125 Hertz for thy Marks and 2295 Hertz for thy Spaces, the Rule of Carson says that thy minimum bandwidth shall be:

Two times the sum of (9.250) which comes out to 18.5 KHz - which is damned well gonna take you into the next channel and irritate the troops!!!

Therefore, oh ye of half a wit, I say unto thee, foresooth! Drop thy deviation down to no more than 2 KHz on Space tone and the bandwidth occupied by thy Marks and Spaces shall be about 13.2 KHz, which will stay within the realms of thine own channel and not cause bubonic sidebands to spread over the land!!!"

And I spake again unto the newcomer saying, "Hear, oh newcomer! Gaze upon the face of my wondrous Spectrous Analyzer and see the tube therein, and judge ye the magnitude of thy sins!! See wherein and wherefore thou createth a festering and a cankering upon the channels of thy band and upon the band of thy siblings!!"

And invoking the Oracle once again, I raised my hand and there came a vision upon the tube of my Spectrous Analyzer which did appear thus as is shown:



Wherein FC = carrier frequency
FM = modulating frequency

"Lo! the result therefrom is that thou taketh up buncha more space of our Holy Spectrum than thou thinketh, oh mental midget! Thou hast the wit of a fence post, the intellect of a hockey puck!!"

And these things which I command thee this day shall be for a sign unto thee, for they are written down in the Functions of Bessel, from which there is no escape. Yeah, verily, we are all slaves to the Rule of Carson and the Functions of Bessel, and woe be unto those who flout their might and risk their wrath.

And thereupon I spake again unto the newcomer saying, "And remember this - there is a significant sideband energy as long as the sidebands are stronger than 26 dB below the unmodulated carrier, sayeth the FCC! Hark! They, the FCC, are the Holy Ones, Keepers of the Tickets and Givers of the Law. Do not anger them, for they will smite thee and cause thee grievous wounds. And should the Feds ignore thee, then thy brethren on the channels will seek thee out and cast thee into the digital wilderness from whence thee came!

Hear, oh newcomer!! Cleanse thy act and get thee to a deviation meter!! And be cool for all times."

And thus ends the Parable of the Marks and Spaces and the eternal truths of the Rule of Carson. Let these words be unto you for a lesson.

Given under my hand and seal on this tenth day in the month of March in the year of our Lord 1991 on the Island Of Long By W2JUP, the Patriarch of Farmingville



For All RTTY Users:

There seems to be a lot of invalid mythology in the field of RTTY and amateur digital radio. Perhaps there are some points that might be clarified for better understanding.

The length of the standard teleprinter line is the RTTY service is stipulated internationally at 69 columns or characters. The 72-character line is a U.S. domestic carrier (Western Union) spec which was never recognized outside this country. While computer-based TTY is the rage here in the USA, large numbers of DX stations are still using surplus or retired electromechanical teleprinters, mostly Telex machines, which are 69-character line printers. Until you know for sure that the DX station is not running an electromechanical printer, play it safe, be nice, and don't exceed 69 characters so he doesn't have pileups in the right hand margin. You'll never know how much the DXers appreciate this minor point.

As to the need for incorporating your name and QTH in the CQ call itself, that's a matter of personal taste and I won't debate taste at all here.

The number of RYs sent, if sent at all, should be relative to the general band conditions and the operating mode. If the band is in good shape and copy is reasonably error-free, long strings of RY will only try the patience of the average DXer.

If you are operating in AMTOR, especially Mode B (FEC, or Forward Error Correction), do NOT (repeat NOT) send RYs at the beginning of your CQ call or bulletin broadcast. AMTOR listener stations cannot (absolutely not) synchronize their data controllers to RY characters, or for that matter, to any data characters. Begin all of your AMTOR Mode B FEC transmissions with at least five (5) seconds of automatically introduced "idle" signals. Do NOT type any data input to your controller. You may not be aware of it, but when you send FEC, your AMTOR controller is sending "idle" characters in the AMTOR code. These "idle" characters provide the transitions that the distant station requires to tune in and acquire sync.

In conventional RTTY, once the contact has been established, in my opinion the RY strings can be dropped. Again, it's a matter of operating skill and personal taste.

Begin ALL of your transmissions by typing your <Enter> key to send a Carriage Return/Line Feed sequence. It's an important courtesy to make sure that the distant station's screen cursor and printer (if he has one) is returned to and lined with the left margin. In addition, always end your transmissions with the same <Enter> key routine. It's just plain good operating practice.

As more and more new operators join us on these digital modes, you older hands have the responsibility to share your skills and point the way.

Now for the hard part...

Many operators feel the need for demonstrating their creative and artistic skills. Hold the cutesy-cutesy pseudo-graphics until after you find out what kind of gear the other guy is running. I assure you that the majority of DXers are not impressed by having their screens and printer pages filled with all that sweet stuff like:

```
*****JIMMY*****  
IN (((((((WEST OVERSHOE)))))))))  
-----!!!!!!KENTUCKY!!!!!!-----
```

Matter of fact, on HF, many stations operate with USOS or "Unshift On Space" turned ON. Sometimes the cutesy graphics end up on the DXer's screen or printer page as just so much garble. I have known cases in which DX stations start to tear their gear apart looking for the cause of so much trash.

Remember that every time you break a LETTERS string with unnecessary FIGURES shifts and upper case effects, that's one more chance

for increased hits and higher error rates.

Here's a comment about the average DXer's machines. Except for Canada and Mexico, you won't find any Teletype Corporation equipment in use. Most of the available electromechanical machines are the German Siemens Model 100, the French Sagem, the Italian Olivetti, the British Creed, the Swedish Ericsson, and a few oddball machines from the eastern block countries. They will all be 69-character machines. They will all have keyboards based on Baudot code, International Telegraph Alphabet Number 2 per the CCITT. And what's even more interesting is that according to our recently modified FCC Part 97, we ourselves SHOULD be using this same ITA#2 international alphabet in Baudot/Murray RTTY operations!

Now, let's talk about the keyboard configuration situation. Here reigns mucho misunderstanding, even unto the depths of the so-called experts who write in various RTTY publications. Let me lay the facts upon yez all...

There are important differences in the Baudot/Murray code as commonly used here in this

(cont'd on page 24)

The Rose Network

by Bruce LaPointe, WD4HIM

I'd like to share with all network managers and other interested parties something that will do much to enhance your network. This "something" is Rose Networking (Rats Open System Environment). RATS is the New Jersey group who developed the system for amateur packet radio use.

Included in Rose features are: one line connects; applications like Heard, Users, Info, virtual circuit connections, no node broadcast; no mnemonics for calls, only actual calls are used for proper id'ing of the switches; no beacons; can be used as a one hop digi; fully compatible with the rest of the network. It does not talk to Netrom nodes in the same language but can use Netrom nodes in the routing to another Rose switch using a Netrom node as a digipeater. That's if the Netrom nodeop has digipeating enabled. Callsign headers include all needed routing info to other stations being monitored at each end.

Tom Moulton, W2VY is the main developer of Rose and thanks to his hard work and not giving up on a good thing we now have something to replace all those technologically outdated Netrom/thenet nodes. Rose has been around for a few years now, under development at different stages. I first tried it back in

1986 when N2WX, who lived in Melbourne, Florida was doing some development on it. ROSE was then called COSI switches. I don't remember what COSI stands for, sorry. Luckily I got a chance to help test it. It was kinda buggy, but it was the first of the level 3 switches. We called it level 2.5 since it did not have any automatic routing switching capabilities. It was like what Netrom is now, except Netrom has routing tables.

Anyhow, when Netrom came along we went with it because it was more advanced. It still wasn't what I expected of a network. It was too demanding of the users. It would only go so far without having to "build" your path manually. The problem with Netrom is the "Quality" Netrom assigns to each node it knows about. The more hops away, the lower the quality, which means the less chance you have connecting to a node 6 hops away without "building" a path to it.

That's why you now see terminal programs that will build your routes for you. Connect to this node, connect that node, etc, until you get to where you're going. All the time waiting for that familiar "connected to..." message. There

(cont'd on page 11)



The L.L. Grace DSP-12

Welcome back to the second installment of this column - dedicated to exploring the latest developments in Digital Signal Processing in amateur radio. In the previous issue of Digital Digest, the premiere column covered some of the basics of DSP technology and quickly reviewed some of the various DSP products that have been announced. I've contacted these manufacturers for more information on their products that I can report to you through this column.

The first company to get back to me was L.L. Grace, so I'm going to pass along some information about their DSP-12 product in this column. I plan to dedicate future columns to examining the offerings of other manufacturers in a like manner. Most of the information in this column regarding the DSP-12 was provided to me by Brooks Van Pelt KB2CST, owner of L.L. Grace.

First of all, I'd like to correct a potential misunderstanding regarding the DSP-12 from the premiere column. In that column, I mentioned that the DSP-12 had been advertised in QST for the past several months. It has, but although advance orders are (were) accepted, the unit won't be available until March 1991, which is now. So, I assume that the DSP-12 is currently available.

With that out of the way, let's look more closely at the features of the DSP-12.

The DSP-12

As initially supplied, the DSP-12 will support HF packet, RTTY (both Baudot and ASCII), VHF packet, 400 bps PSK (for satellite telemetry), and 1200 bps PSK (also for satellite work as well as earth-based links). The FSK modem (used for RTTY and packet) can be programmed for any tone pair - an advantage of DSP technology.

Future features include support for 2400 bps packet, 9600 bps FSK, and Morse code. Also planned for the future are WEFAX, SSTV, AMTOR/SITOR, NAVTEX, and RUDAK support. These updates, along with others developed either by L.L. Grace or individual users, will be available to all users through a quarterly update list and a landline BBS is being planned.

Hardware wise, the DSP-12 comes with 32K of RAM and 8K of battery backed RAM. A 1MB expansion option will increase the 32K of RAM to 1MB. The expanded RAM is automatically used for buffering and mailbox space. The expanded RAM is recommended for users who

will be doing software development or experimenting with voice digitization. The built-in clock/calendar can be battery backed as an option, and the 8K of battery backed RAM can be increased up to 32K. An 8 channel A/D (Analog to Digital) telemetry/experimentation option adds an 8 channel A/D and a single channel D/A to the DSP-12. This option will allow experimentation in digitized voice and telemetry.

The potential uses of the 8 channel A/D option are interesting. In packet voice mail, the DSP-12 can be used to record a voice message that can be transmitted via packet to another station for replay. With the 1Mb RAM option, the DSP-12 can store as much as five minutes of audio. When used for telemetry, the DSP can monitor and report the analog readings of up to 8 analog inputs.

Adding options after initial purchase entails returning the DSP-12 to L.L. Grace for installation. This allows L.L. Grace to install the options in a static controlled environment and test the unit before returning it to you.

The DSP-12 is based on a PC compatible architecture using a V40 (Intel compatible) microprocessor. This allows the use of standard PC languages and development tools when writing software for the DSP-12. The unit uses the Motorola DSP56001 DSP processor as covered in the premiere column. The Motorola DSP56001 is being run at 24MHz. Power requirements are modest: 10-15 Vdc @ 750ma. There are three radio connectors, and the RX and TX can independently be switched in any combination. As implied earlier, the DSP-12 contains a built-in packet mailbox.

The source code and schematics are available after returning a nondisclosure agreement included with the product. The V40 code was written in assembly language and compiled with Borland's Turbo Assembler. The DSP code is also written in assembler and cross-compiled using Motorola's DSP56000 family cross assembler. The Borland products are commonly available, and the cross assembler can be purchased from Motorola for \$495. The DSP-12's built-in firmware contains V40 and DSP debuggers. These will allow you to load code, run code, and peek at memory locations.

DSP-12 Station Set-Up

The DSP-12 can be connected to the audio circuitry of any transceiver just like a TNC. A typical station might have three radios simulta-

neously connected to the three available radio ports - a HF transceiver, a 2 meter rig, and a multimode UHF radio for satellite work. Almost any terminal can be connected to the DSP-12's RS-232 serial port. Most users will use a PC running terminal emulation software. Some aspects of the DSP-12's user interface can be observed from the screen dumps accompanying this column.

Conclusion

The DSP-12 is an example of the current state of the art in amateur radio DSP technology. Unlike the initial introduction of TNCs to the amateur radio scene, DSP units can be put to use immediately in a variety of uses. For more information on the DSP-12, contact L.L. Grace Communications Products, Inc., 41 Acadia Drive, Voorhees, NJ, 08043, (609) 751-1018.

I'll continue to keep you apprised of any updates to the DSP-12 in future columns. If you have any direct experiences with the DSP-12, or any DSP unit for that matter, I'd like to hear from you. I prefer E-mail to CompuServe 72276,2276 or Prodigy SCSD46C. ☐

Every Issue of Digital Digest on microfiche

The entire run of DD from the premier issue of November/December, 1988 through last year is available.

You can have access to the treasures of DD without pounds of bulky back issues. Our 24x fiche condense the publication to a size that will fit in a card file on your desk.

We offer a battery operated hand held viewer for \$75.00, and a desk model for \$220.00. Libraries also have these readers.

The collection of seven back issues is available as an entire set (no partial sets) for \$17.50 plus \$2.50 for shipping (USA). Annual updates available for 10.00.

Your full satisfaction is guaranteed or your money back. VISA / MC accepted.

BUCKMASTER PUBLISHING

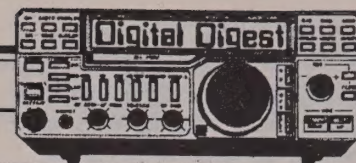
"Whitehall"

Route 3, Box 56
Mineral, Virginia 23117

703: 894-5777

800: 282-5628





Display from DSP-12 user interface Version 0.10 (July 1990)

E>gce

```
*****
* General Communications Executive (GCE) 0.10 *
* 00/00/00 00:00:00 DSP: Stopped *
*----- Main Menu -----*
* (C) 1990 L L Grace Communications Products Inc *
*****
<A> Run Standard DSP & Terminal Programs
<B> Configuration Changes
<C> Debuggers
```

Enter your selection...a

** PACKET (Synchronous) MODEMS **

```
<AA> 300 bps Shift= 200hz, Mk=2110+ <AB> 300 bps Shift= 200hz, Mk=1600+
<AC> 300 bps Shift= 200hz, Mk=0980+ <AD> 300 bps Shift= 200hz, Mk=1650+
<AE> 300 bps Shift= 200hz, Mk=1070+ <AF> 300 bps Shift= 200hz, Mk=2025+
<AG> VHF 1200 bps Shift=1000hz, Mk=1200+
<AH> BPSK 400 bps Manchester (OSCAR-13 telemetry)
<AI> BPSK 1200 bps (MicroSats, FO-20)
<AJ> V.26B 2400 bps
<AK> K9NG 9600 Direct FSK
```

** FSK (Async) Modems (for RTTY, ASCII, AMTOR) **

Enter these codes with the speed after the code, eg, BA110
Valid Speeds: 45,50,57,75,100,110,150,200,300

```
<BA> Shift=170hz, Mk=2125+ <BB> Shift=170hz, Mk=1445+
<BC> Shift=170hz, Mk=1415+ <BD> Shift=170hz, Mk=1615+
<BE> Shift=170hz, Mk=1915+ <BF> Shift=425hz, Mk=2125+
<BG> Shift=850hz, Mk=1275+ <BH> Shift=850hz, Mk=2125+
<BI> Shift=85hz, Mk=1657+
```

** Other Modems **

```
<CA> CW: 750hz +/-100hz
```

Enter modem# (or ZZ to leave DSP processor as is)...zz

** Standard Terminal Programs **

```
<1> PACKET-TNC
<2> KISS/SLIP
<3> OSCAR-13 Telemetry
<4> RTTY
<5> ASCII
<6> CW
```

Enter Terminal-Program# (or 0 to remain in GCE monitor)...

Prices for the L.L. Grace DSP-12 & options

DSP-12	\$595
1 Mb RAM expansion	149
Clock/Calendar battery backup	29
8 Channel A/D option	49
Power Supply	19



Taking a Walk - Persistence Pays and other topics for thought & conversation

TAKE A WALK . . .

Recently, one very nice pre-spring day, around lunchtime, I passed a neighborhood park which has a walking and jogging track. It was full of energetic individuals briskly making the half mile loop. One person which stood out was a very obese lady in a sweat suit which was very unbecoming as well as being very tight.

It took my senses a second to realize what I was seeing, for it looked hopeless that the lady could ever make enough rounds of the track to reduce her size. Yet, she was putting forth an extreme effort to make a good pace, and working awfully hard. She gained my admiration quickly, because there she was, beginning something that surely must have seemed hopeless to her. It was a first effort toward achieving a goal only she knew exactly, but which most observers understood.

Sometimes it is very difficult to start on something that seems impossible. We are easily discouraged and often give up quickly. I don't know about the lady walking, how she will do or whether or not she can achieve success. What I do know is that those that have the persistence to continue any activity, soon find that some measure of success will start to appear; then that encouragement can bolster the effort and more success will follow.

Let's say for example that you don't understand computers and that you are afraid of the technological maze inside the little tan or gray boxes. If you stop and think, you will realize that only a few years ago, nobody ever heard of a "personal computer." How do you think so many people have attained the skills to use and program personal computers? Simply, they took the challenge, started out and little by little it happened. If there is something you see others do easily, and it interests you, strike out with the first step. Be persistent, and enjoy each small gain in knowledge. Build on each day's efforts and before long, you can be the expert.

In amateur radio, and particularly the digital modes, there are many things to learn. You can take your pick and gain a great personal reward. Everyone who ever got a ham ticket knows the pride of this achievement and the ticket is only a very small piece of the much larger pie. Try a taste of something that has puzzled or perplexed you. You may be a fat lady today, but who knows . . . tomorrow you may be a ravishing beauty.

HANG IT ON A POLE . . .

While we are on the subject of things I've noticed lately, besides the high cost of everything I like, there is the subject of the poor telephone and power poles in my neighborhood. They are suffering under the strain of old age and increased taxation. Not only do they support power transmission lines, telephone lines, cable television lines and every now and then, a street light, recently a second set of cable television fiber optic cables was added. As soon as that was started, the original cable television system, began to upgrade it's older lines and add new fiber optic cables. Competition, it is called, but I wonder how the poles can survive.

It was not long ago, when several cable outfits came to town to make a plea before the city council to gain permission to serve our small city. As I recall it was a real dog and pony show, with each company telling of it's benefits to the community and each local politician reveling in the spotlight of the progress he was bringing to his constituents.

In the highly regulated environment of "public service" a company was selected, the wires were strung, and our little corner of the world had CNN. We had arrived and become enlightened; we were part of a much bigger world.

ROUND TWO . . .

When the second cable company came to town not long ago, the fanfare was quite different. Now the cry was the benefit of more investment in the community, and of free competition. We could choose who brought us CNN or Home Shopping Network; all to the undoing of the poor wooden poles.

During the intervening years, most of us had not paid much attention to what we were being told or sold. De-regulation had come and changed things drastically. Airlines were going out of business one after the other; or merging while trying to survive. Saving and Loan Associations were the tragedy of the decade and the soundness of their big brothers the banks is very suspect. Telephone service was now cheaper, I think, but so confusing that I never know who's system I am using.

Lest we forget, the benefit is more wires along the roadway and multiple ways to get cablevision. The cost of the cable service is not cheaper, we are simply paying now for more

wires where we already had a perfectly good system. How can we be so stupid as a nation?

THE ULTIMATE DE-REGULATION . . .

Historically, as society has grown in numbers, man has found the necessity to pass laws to protect the group. There have been, over the centuries, many unless and unworkable laws such as prohibition, but on the whole, our organized and complex society, depends of rule of law. Where some things like public power service is concerned, we have decided that it makes no sense to allow competition, and in fact it is better to have one good company, that operates as we direct.

It has worked pretty well. If you don't think so, reach over and switch off the light you are now using to read; then switch it on and see if you have power. We all complain at the cost of power, but what if we had to pay for two competing systems. The infrastructure for power generation and distribution would cost twice as much and we, the consumers, would pay. Yet, the lesson was not well learned and in our endeavor to regain world leadership in the economic world, we listened to prophets from Wall Street who wanted more opportunities. They espoused the de-regulation theory, where the world was a more free place and there was more opportunity. They sang the same tune as the business men who fought the laws against child labor abuse.

If we really want de-regulation and more freedom, why don't we let all the criminals out of jail and do away with the laws that put them there. That would be the ultimate case of undoing.

DO WE NEED THE FCC?

During the time we were turning loose all the business crooks to undo many of the institutions that were working well in our behalf, we saw the cry for less government. I agree completely that we pay too much in tax, but after all it is cheap rent considering what we get; or used to get. More efficiency in government can save us all lots of money, but I am not convinced by what I have seen happen to Amateur Radio, that we need less regulation. As the Federal Communications Commission has deregulated, what we now have is a hobby that is a stepchild to the system. Many of the changes we have seen, like volunteer examiners, may not be all bad. It puts on us as a group, more responsibility. Yet, I can remember how nice it was to have uniform examinations, to insure that every license was gained by the same level of effort and training.

What I think is that we do need regulation; it helps us all. It keeps the standard high, the bands clean, and us on our toes; and that is not bad. We share a resource that is not endless



and it needs guidance by us all as a social group; and that means government. Surely, the FCC must be an impartial group, not favoring either us, business, or the politicians who come and go. With the right people looking after our joint interests, fairness should not be so hard to achieve. Let's regulate the hell out of radio; let's not destroy it by letting it become anarchistic.

WHICH DO YOU CHOOSE?

Not often do I quote my father, because he never said many things that are quotable, but here is the best. "If given a choice, I had rather be lucky than smart!" Think about it and decide which you would choose; or maybe you will decide that being smart brings luck. I am not so sure and experience tells me that sometimes brilliance does not bring success; at least while you are alive. Later it has often brought acclaim or fame, but not always prosperity or a long life.

I may not be too smart, but I am surely lucky; and I hope you are too. I have the good fortune to live comfortably, do most of the things I really want to do, and have good health. The later may or may not be related to luck, but to what else can you attribute good health? Application and exercise will help you stay healthy, but cannot produce a body that will withstand all disease. Good luck may just be the answer.

HIGH SEAS DIGITAL . . .

Each year that passes has seen boaters enjoying a much safer and more convenient passages because of progress in the electronic's field. Near the coast of the US, LORAN C has become very inexpensive, and become affordable for almost all boaters who use coastal waters. Without getting too technical, since I know little about the electronics workings, LORAN C is based on transmissions from several stations which the receiver monitors.

The time difference between the various stations is calculated and therefore provides a reference for the software to calculate the latitude and longitude of the receiver. The system which is operated by the US Coast Guard is simple, reasonably accurate, and will be around for a long time. Normally, you can expect to get your location within about 1/4 nautical mile, in an area within 500 miles of the coast.

However, LORAN C is absolutely useless away from the populated coasts of the world, so the military has developed a new satellite system called GPS (Global Positioning System). The satellites are launched by the space shuttle, and the delays in the space program have hampered full operation of the system. As of November 1990, 2 dimensional fixes were

possible for about 20 hours each day. Ultimately, the 24 satellite system will provide 3 dimensional fixes around the clock, making it useful to aircraft as well as ships on the high seas.

GPS accuracy is very good, if the military wants it to be good. Built-in is a "degradation" which reduces the accuracy from 16 meters (for the military using special equipment) to 100 meters (328') for the rest of us. It has been reported, that the reason the system was designed in this manner was that in the event of war, the enemy could not use the system with as much accuracy as the US military. However, it was a fact that during the "Desert Storm" operation, full accuracy was restored to the system, reportedly because the US military did not have enough special receivers and had to rely on commercial equipment. I have even seen reports where tank commanders had their wives ship hand-held marine GPS units, for use during the campaign.

Functions of the various units now reaching the market feature such items as speed, course, range, bearing to various selected points and time to go to "waypoints." The internal software, completely automates navigation and is as simply programmed as most of the LORAN C systems.

In future issues, it might be interesting to look into more detail about how the system actually works, but at present I have found little describing the full detail of operations. To be sure it is digital, and the data from each satellite, time references, location and such are rapidly compared and referenced by the receiver. If you would like to know more, let me know.

INTERFACE . . .

While on the subject of navigation systems, it might also be useful to note how sophisticated the electronics industry has become, where the market is strong and can pay for product development. First the NEMA 180 standard interface was adopted, and currently the NEMA 183 interface is provided for most boating electronics. That includes the sharing of data between the radar, Loran, GPS, SATNAV, autopilot, speed/time/distance log and graphic track plotters. Again this is an interesting topic and has great possibility for ham gear.

TEASER OF THE MONTH . . .

My friend from points way beyond here dropped by the other day to chat about the troubles he was having with his ham gear. Apparently, he could receive on all his equipment, both HF and VHF, but could not transmit. As he described it, every time he tried to contact another station, it was in vain. Nobody ever heard him.

The conversation lasted quite a while, and he vowed he had checked everything possible, including antenna switches, mike volume, antennas, and the signal strength of his transmitters. I gave a few suggestions for other things to check, but a later report explained that still there was no response. Realize, that his station includes a PK-232, Icom 735, 2 meter rig and all the related antennas and equipment; yet none of the available frequencies or modes seemed to work.

My friend has asked that I seek assistance from others, and since I am aware that the Digital Digest readers are among the most sophisticated electronic wizards anywhere, I am passing this along. If you have suggestions, let me know. The person who solves the riddle will certainly be rewarded, if not here, in heaven.

(Cont'd from page 7)

are no "node broadcast" with Rose to clutter the frequencies either. Since routing tables are built manually and uploaded to the switch via radio link, no terminal connection is needed to set up the Rose switch. Burn in your defaults (such as calls, tracks etc. to an eeprom just like Netrom/Thenet), and plug it into any TNC2 or compatible. Some flexibility is built into Rose for changing your call, routing tables, connect text, etc. remotely from your home.

You start with an Ascii file containing callsign info for each switch you put up. This file is converted to a hex file with a conversion program supplied with the Rose disk and uploaded to the switch. For example, from WD4HIM-8 on .07 I send all 904 addresses to WD4HIM-6 on 220 which passes it to N4EEB-3 in Daytona Beach. N4EEB has his tables broken down to distribute to the 904 exchanges.

All I worry about is what to do with other local 407 exchanges, and my direct connect neighbors. Not nodes three or four hops away, which is simpler and a lot easier than trying to "perm out" routes using Netrom which would become adversely affected with routing loop problems by the influence of new nodes and band conditions. Rose won't have this problem unless a nodeop slips and programs it wrong. But with only having to worry about what to send your neighbor this gets rid of the looping problems. So far, that hasn't happened because of the simplicity of the routing scheme.

The Heard, Users, and Info applications are also remotely uploaded as needed. If you have two or more port sites, Rose can be multiported in the same manner that Netrom/Thenet uses. I'm only running two port configurations but know of plenty of three and four port Rose

(Cont'd on page 13)



Software for the QRP DXer



This month we are going to look at getting organized with three outstanding log/record keeping software packages that will go a long way towards organizing an active QRPer's efforts at chasing DX, contesting and hanging some well earned "wall paper" in the shack.

The first software package, The Total Ham Plus is from Dick Miller, WD4AZG, of Remware, Inc. (P.O. Box 1566, Manassas, VA 22110). Dick has put together an impressive ham radio database management package that will accomplish the following: logging (regular, net and contests, including duping), checklists for DXCC, WAS, WAZ, WAC and county hunters, QSL card processing, QSL card labels, log printouts, information screening, beam headings, prefix listing, etc. Beam headings are customized for each customer with information provided by the user (nice touch).

The Total Ham Plus is a rather large program on eight 5-1/4 inch, 360K disks. System requirements are 100 percent IBM compatible computer, 640K

RAM hard disk drive or dual 360K floppy drives. While the program will run on dual floppy drives, Dick highly recommends that it be installed on a hard drive to keep the speed up and to be less hassle to the user. The Total Ham Plus is designed to be running while you are on the air. All areas of the program are available at the touch of a button so you will be able to log and dupe at the same time, as well as have beam headings, country, zone and state check lists, QSL and other information available right when you need it, not after you have signed off.

Dick's software comes with extensive, well written documentation that details how to install, run and customize the program to your needs. In addition, the manual details each menu and applications screen for a complete walk-through of each area of the program. The manual will answer 99.9% of your questions. For those real unusual cases, you can always call Remware and discuss the problem directly with the man who wrote the program. That's what I call support.

The menus in The Total Ham Plus are of the lite-bar type. Up/down arrows move the highlighted bar around the menu. Pressing enter will select the highlighted option. The menus allow for quick return to previous menus and a help box which shows more information on what the selected option does is displayed at the bottom of the screen. Certain log printouts are done in compressed print mode. During initial set-up, the program prompts you for the necessary information, ensuring that your printer is set up correctly to use all the features of the program.

Highlighting logging on the main menu and punching the enter button will take you to the logging menu. Here you will be asked to select from regular logging, contest logging, net logging or log maintenance. From here you select the type of logging needed and then go to that portion of the program where band and mode selections are done.

From there it is on to the actual application. The speed is quite good, even on my stock IBM PC/XT (with no turbo board... yeah, I know, it's a drag at 4.7 MHz!).

The Total Ham Plus software package is available from Remware for \$59.95 plus \$2 shipping (US and Canada) or \$5 overseas. An additional \$5 will get you the software on 3-1/2 inch floppy disks. I like this program a lot and while it is a little on the pricey side, it is one darn good piece of software.

The KT5X Contester, from the genius of Fred Maas, KT5X, and distributed by Desert Designations (Rt. 9 Box 86-H, Santa Fe, NM 87505), is one of the better known pieces of software in contesting circles. My review version (5.11) came on two 5 1/4 inch 360K floppy disks with a comprehensive instruction package. System requirements are IBM PC, AT and compatible using DOS 2.1 or higher, color graphics card or emulation (CGA or EGA) and at least 128K of RAM. This program can be used with a single disk drive but works best when installed on the old hard drive. Having used

several other contest programs, I was intrigued by this particular software package because of its adaptability to everything from sweepstakes to QRP ARCI QSO parties.

The KT5X Contester is a very versatile logging program. Once it is installed on the hard drive you are ready to initiate the program. The program prompts you through the initial set-up to customize the parameters to your particular location. Once you start a log (following the detailed instructions) you can configure that particular log to whichever contest you are currently engaged in. This program will count multipliers per contest, band or mode; just tell it ahead of time and it's all automatic! Duping is automatic and dupes are allowed to be logged, if you desire. Help screens are immediately available, as is the current ARRL DXCC listing and international call sign prefixes.

Ever wonder how many QSOs you make per hour? The KT5X Contester gives you this information at the touch of a button. Bearings are obtainable during the logging process by either prefix or grid square (a nice touch for the VHF contester). Old logs can be entered in a non-real time mode for duping and printing. Dupe sheets and QSL labels are available also. A sweepstakes library compiled from contesters' logs also comes with the KT5X Contester program. This includes between one-half to three-quarters of the stations actually encountered during sweepstakes. The sweepstakes library notifies you of the station being worked and lets you know if it is a new section multiplier (another nice touch).

All you have to do, providing nothing is unchanged, is hit the button and the station is in the log. Priced at \$39.95 the KT5X Contester software package is a good value for the money. If you are an avid contester, you'll find that this contest program will definitely make life easier.

Finally, the WJ20 Master QSO Logging Program (MQSOLP) by Dave Farnsworth, WJ20, is an outstanding software package. The program consists of three 5-1/4 inch 360K disks. System requirements are IBM PC, AT or compatible, 640K, hard drive recommended) or dual 360K floppy drives. Version 2.0 was furnished for this review and is a rather large program which lends itself well to hard drive installation. Its purpose is to serve as one main database to log all of your QSOs, print various logs, reports and labels, and input data from other sources including the KT5X Contester program).

The MQSOLP is a very versatile data base management package. Logging programs include a DXCC log, master logging program, net operations logger, QSL and label printer, selected reports printer and selected files trans-



fer. In addition, available data includes international prefix allocations, net data, DXCC countries list, state abbreviations, international time zones, Q-signals, etc. There's lots of information available here at the touch of a button.

Once this program is installed on the hard drive, you are in for an experience. Type log and hit enter, and you'll be in the main menu. You can even personalize all your QSL information and have this printed out when you print the QSL cards.

The master log is the heart of the MQSOLP. All other program modules support the master log. The screen displays the DXCC country name,

local and UTC time, total QSOs (both DX and US), complete log data for the station in QSO and some supplemental data including Continent, ITU zone, CQ zone and DXCC country number.

The detailed documentation accompanying the MQSOLP goes through each selection of the main menu and gives detailed information on each area and how to customize that area to your particular needs. In all, it's a very comprehensive documentation package. Four appendices are included to provide information on using help screens, transferring LotusTM files, backing up data files, and accessing reports reference.

The ability of the MQSOLP to import data files from the KT5X Contester program further enhances the usefulness of this software package. The speed is good, despite my sloooooow IBM PCIXT 4.7 MHz clock. For further information and prices, contact Dave Farnsworth, WJ20, 2945 Main Street, McConnellsville, NY 13401.

These three ham radio logging programs are just the tip of the iceberg. Many other pieces of software exist to make life in the shack a little more comfortable for the active radio Amateur. I hope that these reviews will provide enough information to let the prospective user make an intelligent decision when buying. Thanks go to Dick, WD4AZG, of Remware, Fred, KT5X, of Desert Designations and Dave, WJ20, who were kind enough to provide the software for review.

Review by: Rich Arland, K7YHA
Excerpted from World Radio Magazine

(Cont'd from page 11)

switches. I won't go into detail of setting up the switches since all that is contained in the doc.'s with the Rose disk.

I will mention one thing, and that is before you burn an 'eprom to change the I2frack and I3frack from the default of 5 to 2 or 3, I use 2. This change makes a big difference in throughput. I first used the defaults and noticed that the switch was a lot slower at retries than Netrom was, and all the locals started complaining so I changed those two values and now all is back to normal. The reason was because of the way a connect is made. It looks like a digipeater is being used and the frack gets doubled which makes it even slower.

Connects with Rose are only a single line command sent to your TNC. example: C WB4RHO V WD4HIM-8,205793 The first call is who you want to talk to, the next is your local switches call, the last set of numbers is the destination address of the switch that WB4RHO uses in Dothan, Alabama. What happens is when the local switch sees this one line connect it sets up a link between you and it, then sends back a message "call being setup". After your station acks this message, your local

switch will proceed to pass this address and connect info to the next switch down the line and so on until it gets to the switch with the 205793 address. When it gets there, it downlinks to the call WB4RHO. When it completes its connection it sends back a message to you: "call complete to WB4RHO" and you can carry on from there. That path was from Orlando, Florida to Dothan, Alabama.

Rose switches also have some applications I mentioned earlier like Heard, Users and Info. You can use these applications the same way you make a connect. Type: C HEARD V WD4HIM-8,407277 and wait for the call complete message to get a list of calls that the switch has heard. There are two different versions of the heard list. One has more detailed info like times and paths, the other only calls and paths. After getting the "Call complete" message, send a carriage return and wait for the list to come from the switch.

The Users function gives a list of users and is by the way, accurate, which I cannot say for Netrom or thenet. With Rose, the Users shows both uplink and downlink addresses. Type C USERS V WD4HIM-8,407277 with Netrom/thenet

(Cont'd on page 15)



PacComm

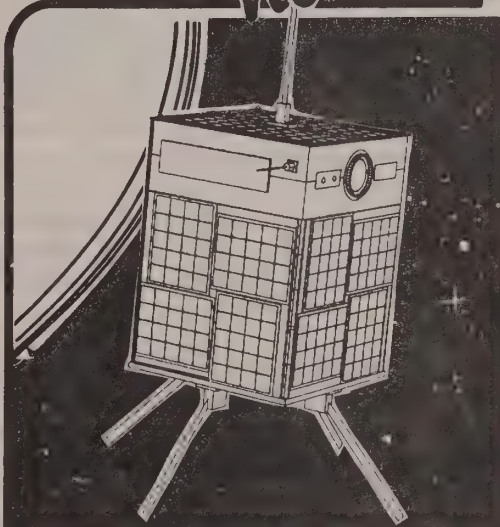
- Advanced Technology
- Enduring Value

New! MICROSAT PSK

The 1st Non-Kit Satellite Modem!

Featuring high performance at low cost!

Only \$219⁹⁵



- Completely assembled and tested - not a kit!
- Supports 1200 baud MSK transmit and PSK receive for MICROSAT access
- Supports 1200 baud PSK transmit and receive for terrestrial use
- Receives 400 baud satellite telemetry signals
- Doppler shift compensating radio tuning interface
- Easily attaches to any TNC modem disconnect header, cable provided
- Telemetry signals output via RS-232 port

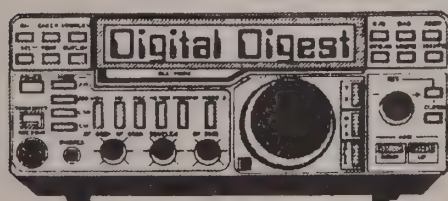
For complete info & specifications
Call (813) 874-2980 To Order, Call
Toll Free: 1-800-223-3511
Major Credit Cards Accepted!

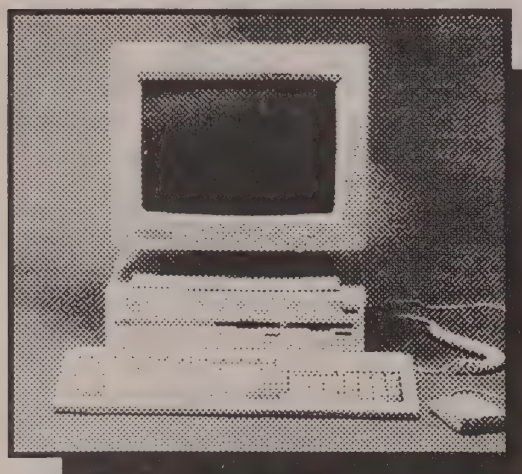
PacComm • 3652 West Cypress Street • Tampa, Florida 33607

☐ Please send more info on the MICROSAT PSK Modem ☐ FREE Catalog

Name _____ Call _____
Address _____ Ph# _____
State _____ Zip _____ Card# _____ Exp. Date _____

MONEY BACK GUARANTEE! Add \$4.00 shipping/handling per order. FL residents add 6% sales tax.
Major Credit Card give number, expiration and signature. FAX: 813-872-8696





Latest News & Developments in the World of Amiga

NewTek's Toaster

NewTek has finally released their long awaited "Video Toaster". This device offers an NTSC video effects engine that performs some amazing tricks in real time with composite video. The Toaster itself isn't very expensive, but requires a large amount of costly support equipment before you can truly "go to town" with it. A 7 MB Amiga is recommended by the manual... to that you will need to add special video tape decks, timebase correctors and more. It gets quite expensive from the average Amiga user's point of view. However, if you're a video person and are trying to get that professional look, the Toaster can give it to you at far less cost than any of the "professional" products.

The release of this product has given a great deal of publicity to the Amiga which the machine can certainly use. We're still seeing hype from IBM and Apple about "multimedia" and video usage of those machines that costs an arm and a leg and can't even compete with a \$499.00 a500 Amiga.

I don't want to use the space here reviewing it yet again, when that's been done in a number of magazines already. The reason that I mentioned it is that I think the release of the Toaster is a very positive event in the sense of being Amiga news, and those readers who are not Amiga owners may not have been aware of it at all.

Cross-Dos, UEdit & my new AT class portable

I've been waiting for CBM to produce an Amiga portable for quite some time now. Running true to form, CBM has ignored or put off the need and I've run out of patience. Luckily, as a result of two particular software products, I can afford to run out of patience.

My new portable is a 12 Mhz 286-based machine with a meg of memory, a 20 megabyte HD, and a 1.44 MB floppy drive. It has a fairly easy to read LCD screen, and set me back a very reasonable \$1100.00, including a whole bunch of (useless) software.

My need for a portable was so that I could write articles (like this one) and some other writing tasks away from my desk. I spend a lot of time on the road, at shows, in hotel rooms and so on, and I really wanted to make better use of that time.

Luckily, Rick Stiles, the author of UEdit, has a version that runs on 80xxx type computers. UEdit is the editor of choice for me on the Amiga, as it's more powerful than anything else I've used and it is also completely configurable. The idea of having to go to something less powerful at the same time as I end up losing multitasking and a nicely readable crt screen was just too much to bear, and so until I learned about the 80xxx version of UEdit I held on to my \$\$\$ and hoped CBM would wake up.

Well, CBM didn't wake up (probably they will never wake up!) but Rick has provided the path I needed for reasonable writing productivity. For those of you who are regular PC users, I can't recommend UEdit highly enough. It is easily the best editor on the Amiga - I wouldn't be the least bit surprised if it was the best editor on the IBM computers as well.

The next software item that has helped here is "Cross-DOS", an MS-DOS filesystem for the Amiga. All I have to do is copy my files from the HD on the portable to a 3.5 inch floppy, put that in the Amiga drive, and copy it from there - Cross-DOS is a totally seamless implementation of the MS-DOS disk reading capabilities that makes this no problem at all. You don't even have to think about it.

The upshot here is that I now have a portable writing system; but I won't have to suffer with learning any of the MS-DOS software. Boy, am I happy.

While we're discussing Intel PCs, I feel bound to say that now that I have had a chance to use "Windows" first hand, it's even worse than it appeared from the spec and from peering over my wife's shoulder as she struggles along with it at the office. It's really too bad... the 386 and 486 machines are finally in the same league with the Amiga for compute horsepower (although they still can't touch the graphics or sound capabilities), yet they are stuck with this crippled operating system. Of course, the new 68040 based Amigas will leave even the 486 systems far behind, but that's the way these things go.

New packet software under development

For those of you who have been waiting for some good Amiga-based packet support software, I'm pleased to tell you that Black Belt is involved with getting some created. We hope to have the software ready in a distributable beta version within about 30 days or so. It offers individual windows for each connection you make, multitasks nicely (of course!) and is configurable to pretty much any terminal unit. I'll let you know more about this as the project gets closer to completion.

Commodore's latest marketing blunder

Oh, yeah. Commodore's gone and done something stupid. Again. This particular incident seems to be directly related to the new change in management - if so, I can only hope that this president's reign will be as short lived as some of the other loons CBM has put in that seat.

CBM doesn't seem to be able to keep a new head long enough for the brain transplant to take effect, anyway - I probably don't have anything to worry about.

So, what's the problem? Amiga World Expo, formerly AmiExpo, is holding a show in New York this March. Nothing too horrifying about that, of course. CBM, in their blundering way, is holding a seminar on the west coast that same day for developers. Not to leave this silliness alone to die it's well-deserved death, they are calling Amiga developers and encouraging them to attend... obviously, if it's on the west coast, said developer won't be at the Amiga show. Most Amiga companies are far too small to be sending emissaries all over creation at the drop of a hat - and most won't want to offend CBM (you'll note that I seem to be an exception to this rule) and so may feel that attending this seminar is a "good thing".

The show has NewTek and their toaster, all the major Amiga graphics developers (Black Belt Systems, Digital Creations, M.A.S.T, Impulse etc) and quite a few other important vendors there. CBM should realize that when they do things to hurt the aftermarket vendors, they hurt themselves too.

Is there an explanation for this bizarre behavior? Well, maybe. Here are some facts. You put them together any way you like. Dionne, the new president, hails from Canada. There is a competing show, "World of Amiga" based in Canada that has (so far) done very well in Canada (where it's the only show) and very poorly in the US. CBM sent a letter to all the developers indicating that World of Amiga in New York was "one of only 2 shows they would be attending this year", no mention of the



Amiga Expo, a far larger and more successful show. Then they pull this absurd seminar move. All of this has occurred since Dionne has had his new seat.

This is the first time I've actually wanted the leadership at CBM to change. Usually, I hope that the new guy will be given time to get things done before he's axed in the usual CBM bloodbath. Not this one - give him the axe now!

No Code

Well, here it is - "no code" at last. Sorta. It's a pretty wounded chicken as I see it; the point in my mind has always been to bring the technical people into the hobby, and get some conversations going about something besides the digits 5 and 9 and remarks like those heard on 80 meters most anytime. With some fresh new technical blood, perhaps our hobby could get back some of that innovative spirit that it had in years past.

Unfortunately, the international rules say you need CW skills for international phone privileges (IE, HF). I guess you'd have to ask the guy who wrote the rule why, but I suspect he died of old age a decade or three ago. Of course, we wouldn't think of doing the right thing as opposed to the rule thing, so we're stuck with "cq dx" instead of technical knowhow. Bah humbug.

I never have thought that ham radio should exist just because it does exist... expanding global understanding, advancing the technical fronts, providing disaster communications channels, focusing young people on a positive, highly social and yet technically sophisticated activity - these are the things I have always seen ham radio as the potential vehicle for.

Few things in ham radio distress me as much as hearing a contest totally destroy one or more of the bands so that emergency assistance, meaningful conversation and cultural sharing cannot possibly occur. I guess we're still stuck with the same old 5/9 babble, though. Nothing the FCC has done is likely, in my estimation, to bring any new technical blood into the HF bands where the big time action is... or could be. When UPS gets half the 20 meter band for interstate package delivery communications, I won't be surprised. But I'll bet the ARRL will.

Switching monitors

Here's an interesting Amiga development as regards my system. Perhaps this information will be of use to you. I've had an AT bridgeboard in my system for quite some time. I have a Zenith VGA monitor that I generally keep hooked up to my Microway FF board. I also have a VGA card plugged into the AT side of my Amiga. I didn't want to have more than one

VGA monitor around, so I'd been plugging the cables in and out every time I wanted to work on the different systems.

I have found that Redmond Cable makes a switchbox that can handle the high-density 15 pin connectors that these things use - now I just flip a switch and I have the other computer on the same monitor. This may seem trivial, but I've been looking for just this switchbox for almost a year now. Perhaps you have too.

While talking to Redmond, I found they also have a 23 pin switchbox, which is just the perfect thing for the Amiga's RGB port. I have both DCTV and the HAM-E, and I like to be able to switch between them too, but had the same problem - I had to swap cables, which involved powering the entire system down. Again, all I have to do now is flip a switch, and I'm all set.

Redmond has a whole bunch of other stuff. Their stationary comes with the logo "The Weird Cable People" and I think it's no exaggeration.

New 9600 baud FAX for Amiga

Black Belt has announced a new, 9600 baud FAX system which incorporates a 2400 baud modem as well. This new product provides send and receive of faxes, text files, and IFF graphics with no pain, and multitasks perfectly with all your other software. If you have an interest in a FAX system, you might want to give us a call.

Glasgow gets a repeater

If you're ever in Glasgow, you might consider giving as shout on 146.22, which is the input of the local open repeater. I monitor it most of the time, and will be happy to say hello if I hear you.

We built the controller for the repeater with a Motorola 68705 EPROM based microcontroller chip and not much else. Nice little piece of silicon, that. The repeater's call is N7CTF/r.

George Buxton, N7EJZ passes away

I regret that I have to pass on this news item. George Buxton, a VP at AEA corporation succumbed to cancer recently. George was a kind, considerate gentleman with a real and contributory interest in ham radio. Much of what AEA has done for the ham radio community was partially due to Georges efforts for all of us. Mike Lamb, president of AEA was a close friend of Georges, and my heart goes out to him in this time of loss.

Still waiting for 2.0

Ah, CBM. No news is... no news. 2.0 is still cooking. I had rather hoped that it would be out by now. CBM is still working on it, though, and still isn't willing to commit to a release date. It will probably show up one day, without any previous warning. I hope so, anyway. ☐

(Cont'd from page 13)

you never know for sure where a station actually uplinked since that station probably was "building" routes and it will only show where he last made an uplink.

The Info application is like a connect text (ctext) in your TNC but can be quite long for detailed info on how to use the switch or whatever. The next question is the most often asked question, "How do I find out what address so and so is located at?" Here is the answer. One use we came up with here in the Southeast is to use the Info text on a backbone switch to provide a directory assistance switch for each area code. Those particular switches are programmed to recognize the 411 exchange. Example: 407411, 904411, 205411, etc. Now there is no need to have a map to build routes. Route building is left to the network and all a user has to do is type: C INFO V WD4HIM-8,407411 for a listing of all the 407 area addresses and corresponding cities. Or: C INFO V WD4HIM-8,904411 for listings north of Orlando in the 904 area such as Daytona Beach, Jacksonville, Tallahassee, etc. The south part of the State is slow to change so there is no listings for that direction except for Tampa and Sarasota on the Gulf Coast and down to Stuart on the East Coast, but I expect to see more and more soon.

Here is another big advantage Netrom/thenet could never handle. Suppose WB4RHO connects to me and my TNC is busy, sends him back a busy and disconnects him. On my terminal the TNC shows "Connect request from WB4RHO, 205793." Right there on the screen is all the information I need to reply when I get a chance and become "unbusy". All I would do is type: C WB4RHO V WD4HIM-8,205793 WD4HIM-8 is my local switch and 205793 is where I want to go, and WB4RHO is who I want to talk to. With the outdated Netrom/thenet technology I would never have known where WB4RHO was located, and would have to hope that he tries again...

Another advantage of Rose, is that if a switch goes down there can be an alternate route programmed in the Rose routing table. The switch that is down will be listed as "out of order" and a Rose switch will not attempt to try that downed switch again until a set time, which is also remotely changeable - the default is 15 minutes.

Some people felt uneasy of the manual routing method but it is a lot better than relying on "node broadcast" from other nodes which a lot of times were useless because of band openings messing up the routes. Some Netrom nodeops get around this by rearranging their parms on Netrom nodes to defeat autobroad-

(Cont'd on page 27)

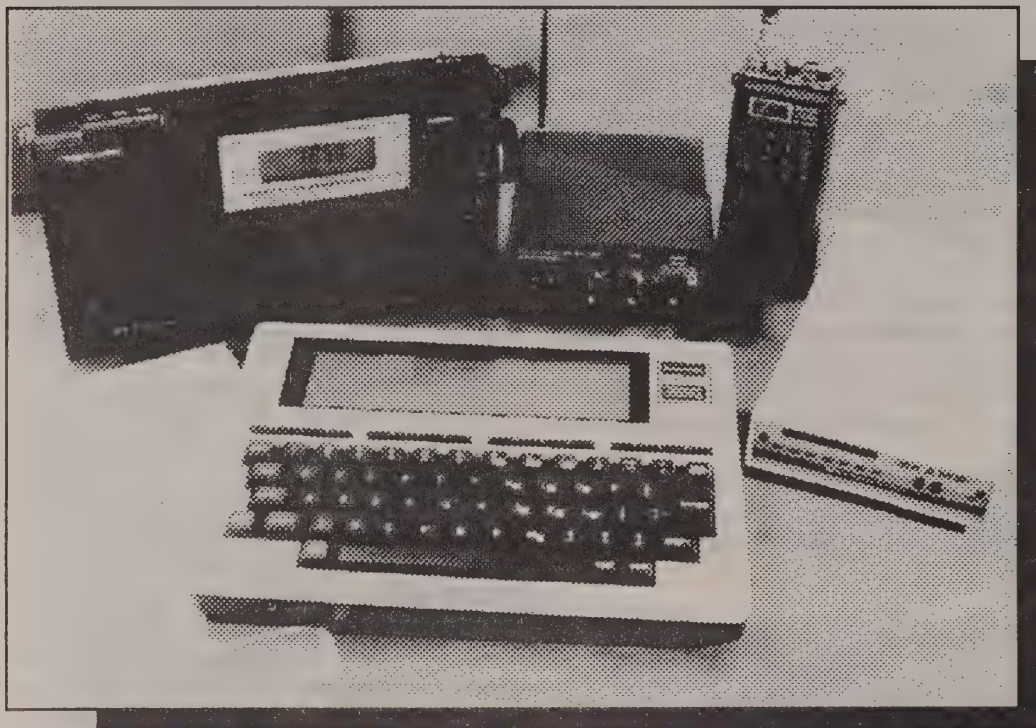


COMPUTERS

by Jonathan L. Mayo, KR3T

3908 Short Hill Drive • Allentown, PA 18104

Portable Digital SWLing



KR3T's latest portable station consists of a Kantronics KAM, Icom 02AT, Realistic DX-440, Heathkit Active Antenna, and Radio Shack Model 100 portable computer.

I hope you enjoyed last issue's Computers column on RS-232 cabling. That column was the second Computers column I've done related to RS-232. This column is also a follow up/extension on an earlier column. In the September/October 1990 issue of Digital Digest, the Computers column covered portable packet operation; it turned out to be one of the most popular Computer columns based on reader response. I've decided to expand on the idea in this column and look into an all purpose portable digital SWLing/communications station.

The portable packet station that I described in my earlier column was for packet only. Since that column was published, I've purchased a DX-440 portable shortwave receiver. I reviewed the DX-440 in the January/February 1991 issue of Digital Digest. By combining the DX-440 with a multimode digital interface, the KAM, I was able to copy a wide variety of digital communications on the HF bands. This article covers this portable station with the hopes of giving you ideas for setting up your own portable digital communications station.

The Station

My basic equipment list is as follows:

- Kantronics KAM Multimode TNC - Icom IC-02AT 2 meter FM HT - Realistic DX-440 Shortwave receiver - Heathkit Active Antenna - Radio Shack Model 100 Portable Computer

The basic requirements for a portable digital communications station are that it must be truly portable, consume as little power as possible, and possess full operating capabilities. A portable computer makes an ideal portable terminal. Units such as the TRS-80 Model 100 feature an LCD display, full-size keyboard, built-in telecommunications software, an RS-232 port, and a printer port. All of this capability fits in a case the size of a three ring binder and weighs about the same. The entire computer is powered by 4 AA batteries for up to 20 hours. Supplemental power supplies are also available that allow for extended operation.

The Model 100 is very popular with packet operators, due to its reputation, low price, and availability on the used market. Its built-in telecommunications software features Xon/Xoff, download and upload, echo to printer port, and high baud rates. Many optional accessories are available, including a battery operated disk drive and printer, many software pack-

ages, and memory add-ons.

Other portable computers are also used with equal success, particularly laptop PCs such as my T-1000SE. Also, a battery operated hardcopy terminal is a possibility. These units often feature built-in acoustic couplers for use with the telephone system. If the terminal has an RS-232 port, it can be connected to the TNC and used as a terminal. However, these units are usually classified as dumb terminals. The advantage of the hardcopy terminals is their extreme low price in today's used market.

The TNC should draw as little power as possible; 250 mA should be the maximum current drain considered for a battery operated portable station (I've exceeded this guideline a little since the KAM draws 300 mA). Some manufacturers offer a version of their TNC with CMOS chips which draw much less power than their NMOS counterparts. They also generate less heat which is especially advantageous in a crowded portable arrangement. Today, there are several TNCs available that are designed for portable operation and draw very little power - although you'll probably have to give up the advantages of HF monitoring.

For VHF operation, a handheld is the most obvious choice. They are compact, battery operated, and can generate up to 5 watts of power. Some require a special interface to allow the TNC to control the PTT. An amplifier can be added for additional range. However, an amplifier can significantly increase the T/R (Transmit to Receive) and R/T turnaround time of the radio as well as drain copious amounts of battery power.

Any antenna system commonly used for FM phone will probably work successfully on VHF packet. Of course, when operating at a fixed location for awhile, you will probably want to put up an antenna with higher gain characteristics. I have had good luck with a regular rubber duckie antenna running about 2 watts in dense urban areas where digipeaters are readily available.

Batteries are the most obvious power supply for a portable packet station. Twelve volt dc gel-cells, while rather heavy, offer 3 to 6 amp-hour ratings and can be used to power most any station. The same power system can be used to run the TNC, radio, and computer. Also remember to bring along a battery charger.

The HF portion of my station consists of the DX-440 connected to the HF port of the KAM. I often use the Heathkit active antenna to improve reception (a review of the Heathkit active antenna can be found in this issue). With the DX-440 and KAM, I can monitor all forms of digital communications - such as Morse code, RTTY (both Baudot and ASCII), and AMTOR.



The entire station will fit, although somewhat cramped, into an oversized attache case. If necessary, you could leave out the active antenna, although I wouldn't want to be without it. This station has all the advantages of the earlier packet-only portable station with the added benefit of being able to monitor HF digital transmissions. Of course, you can also monitor regular shortwave broadcasts. The advantage of this setup is its flexibility.

Conclusion

I really enjoy this "improved" portable station. In addition to adding the DX-440 and active antenna, switching from the Heathkit Pocket Packet to the KAM also added to the station's weight and volume - but the advantages of HF reception capability are worth it. Now when I travel, I can operate local 2 meter packet, copy 40 meter RTTY and 20 meter AMTOR, monitor the packet BBSs on 14.107 MHz, listen to the BBC, and set my watch to WWV. The next evolutionary step seems to be HF transmit capability - I'll let you know.

I'd like to hear from you if you have a portable packet station. Feel free to send me a photo of your station, and I'll see about running it in a future column. If you'd like to contact me with questions, comments, or suggestions, I prefer E-mail to CompuServe 72276,2276 or Prodigy SCSD46C. □

UNIVERSAL RADIO...

has released its latest Communications Catalog, #91-02. The 92 page publication covers equipment for the amateur radio operator and the shortwave or scanner listening hobbyist. Several new items appearing for the first time include the Japan Radio Company's top-of-the-line NRD-535D shortwave communications receiver, Kenwood's new TS-850S transceiver, the Sangean SG-621 and the Grundig Traveller II. This catalog is available free of charge by 4th class mail or at a fee of \$1 by 1st class delivery from Universal Radio, 1280 Aida Drive, Reynoldsburg, OH 43068; (614) 866-4267, fax (614) 866-2339.

LOGIC JR...

is a new computer logging program from PDA that features easy installation, easy data entry and retrieval and assistance at the touch of a key! The program features automatic logging of DXCC zones, name, QTH and date; a multi QSO display for ease in looking at entries; search on any item; progress tracking for awards; an on-line DX progress check; auto DX and direction display; practically unlimited comment space for rag-chews; log printouts, QSL cards and labels! Priced at just \$39 postpaid in the continental United States, Canada or Mexico with versions for IBM-PCs, Amigas and the Atari ST. From Personal Database Applications, Inc., 2616 Meadow Ridge Dr., Deluth, GA 30136-6037; (404) 242-0887.

Keeping Your Computer From Being Your Strongest Signal

As computers play a bigger role in one's Amateur Radio station, there comes a time when one wants to use a computer for RTTY, SSTV, HF packet or as a helper during that fast paced DX contest. I have directed this article to all the Amateurs who built their own IBM PC/XT clones like I did by buying the components and putting them together.

After you played all the games, learned DOS and printed pretty pictures, it's time for your computer to start earning its keep in Amateur Radio. You hook up the computer through your TNC, which you used on VHF 2M packet to the HF radios to get on the bandwagon with HF packet. Having done all of that you're ready, set, go...but wait a minute, what is that noise up and down 20M? It sounds worse than the woodpecker and changing bands does not help. Finally as a last resort you turn off the computer and low and behold the noise is gone.

Why all the noise and how does it get generated? Well, the computer uses digital electronics such as AND, OR and NOR gates and some memory devices. They also run at very fast speeds in the order of nanoseconds. These speeds are in the RF range that causes part of the problem, but there is more. When a digital signal goes from one to zero very fast, harmonics are produced and these harmonics can fall within the RF and HF frequencies. In fact this is how you get harmonics out of a 100 Hz oscillator by having a square wave.

Back in your computer there is a mass of digital signals going up and down ones and zeros at a very fast rate. They mix and this is the noise you hear on your HF radio. Some of the harmonics are suppressed on the system and expansion boards by using bypassing capacitors between power and ground. These capacitors keep the harmonics down as far as other digital signals but not as far as HF radio equipment.

How to solve the computer RFI problem. First turn on your HF radio equipment without your computer on and listen for any background noise and that will give you an idea of what your radio noise is like. Next turn on the computer and listen to see if there is any difference in the noise generated by the computer. When I first used my computer with the FT-757GX, the computer noise was from S2 to S9 depending on what band I was on. 20, 15 and 10 were the worst with S9 + noise while tuning. 40M was S2 without the RF amp on the FT757GX

but still not workable.

The following is a step by step check list by equipment to check out. I assume there is an outdoor antenna with quality coax lead in.

Checking out system unit RFI. With the keyboard, video monitor and printer disconnected from the system unit, turn on the computer and check for any noise leaking from the metal cabinet. If the noise is there, scrape the paint off the lids where they make contact. Also make sure that the system board is grounded to the metal chassis with metal standoffs. I had originally used fiber washers to insulate standoffs from the system board. Removing the fiber washers from the standoffs that could ground the system board helped the computer RFI problem.

Be careful when deciding which holes in the system board to use for grounds. Look for holes that are on the edge of the board that go to the system board's ground plane. Also scrape the paint off the chassis where the standoffs connect and use star washers on the screws that connect the standoffs to the chassis. Finally check to make sure that all other components' (i.e. power supply, hard disk or floppy disk drive, etc.) chassis in the system unit are grounded. If components are not grounded, scrape paint and use screws with star washers to bite into the metal chassis.

Most manufacturers of expansion boards which include memory, clock, serial ports and parallel ports do not adhere to the RS232 standard. Check and make sure that Pin #1 is grounded to chassis. I found that in the expansion board I was using, Pin #1 was not used and chassis was shorted to a 5-volt logic signal via a screw on the serial port connection. I insulated the screw with a fiber washer and grounded Pin #1 to the expansion board ground. The reason to ground Pin #1 is that in the PK232 Pin #1 is shield Ground in their supplied cable. This will help prevent RFI from leaking from the cable that goes from the RS232 serial port to the PK232.

Either make or buy cables that use shielded wire. Some cheap serial and/or parallel cables do not use shielded wire. When I first got my PK232, I used an unshielded serial cable to extend the supplied serial cable and the noise was very bad but taking that unshielded cable

(Cont'd on page 19)



Binary File Transfers via Packet Radio

Introduction

In the PC world most binary file transfers seem to be taking place using the YAPP protocol built into the YAPP user terminal program and the BBS software written by Jeff Jacobsen, WA7MBL. As Jeff stated in the documentation, YAPP was written to provide a terminal program for use in testing the WA7MBL BBS code. However for many radio amateurs, YAPP was their first terminal program.

Transfer of Data

The YAPP binary transfer protocol is similar to the Xmodem protocol used on landlines. In order to transmit a file, the sending station breaks the file down into blocks of characters. Each block is transmitted in sequence. After a block has been transmitted, the sending station waits for the receiving station to acknowledge that block and verify that it was received without errors.

When two stations are alone on a frequency, they can transfer data quite quickly. So back in 1986 when YAPP was written, it provided the few hams using packet radio with a binary file transfer capability. Today, however, the situation is different. In most urban areas, each packet radio channel is occupied by several stations, and the requirements for speedy binary file transfers are somewhat different.

Requirements for Transfer Protocols

The AX.25 protocol provides for a basic verification that packets have been received error free. Thus if the binary file transfer protocol could start sending blocks, after establishing the connection, then keep sending data until one of three things happen; the link drops out, the receiving station signals that some of the data were received with errors in it, or the whole file is transmitted.

If the whole file is transmitted, then the sending station just has to wait for an acknowledgment from the receiving station that the file was received. If the circuit is busy with several stations on the channel, or the path goes through one or more nodes, there will be varying delays in the delivery time of the packets. By not having to acknowledge each block of data in the communications software running in the PC, the file can get through much faster than it would have in the case in which each block has to be transmitted and individually acknowledged.

If the link drops out, it would be nice if the computers, could determine how much of the file was received, then pick up the transmission at that point next time.

If the receiving station signals that some data were received in error, the sending station should then begin to retransmit from the start of the error.

The Zmodem Protocol

This situation is not unique to the amateur radio packet network. It is also present in the commercial packet switching environment, and the Zmodem protocol was developed to provide the capabilities described above. Zmodem thus seems to be an almost ideal binary file transfer protocol for use on radio amateur packet channels, and is incorporated in LAN-LINK 1.59 due for release in March or April 1991.

LAN-LINK uses the :QZD: and :QZU: commands to provide the capability to remotely download and upload binary files. :QZD: allows you to

download a file from another station, while :QZU: allows you to upload a binary file. :QZD: is configured so that if the link drops out during the transfer, when the connection is once again established, a subsequent :QZD: for the same filename, will cause the transfer to pick up where it left off when the link dropped out. This feature is not allowed in the upload :QZU: command to inhibit people from injuring files that already exist on the other computer. Each command may be initiated from either end of the link, but to gain the most from the recovery capability, files should be downloaded by the receiving station.

The PCZ Package

LAN-LINK implements the Zmodem protocols using batch files in DOS that call up external programs. This approach allows stations to try different versions of Zmodem and experiment to find the optimal one for their area. LAN-LINK comes with the (PCZ) Public Domain implementation of the Zmodem, Ymodem, Xmodem, Xmodem-1K and Sealink protocols by Drue Kennon and Gary Smith.

While each LAN-LINK user can set up binary file transfer batch files to implement any of the protocols, LAN-LINK comes with default batch files for Zmodem. Each pair of users can experiment with other protocols using the :QBU: command after reading the PCZ documentation.

Configuring for Zmodem Transfers

As any LAN-LINK station can either receive or originate a :QZD: and a :QZU: command, LAN-LINK uses four batch files to control Zmodem transfers. These files are as follows.

QZU-RX.BAT	Batch file implemented after receipt of :QZU:
QZU-TX.BAT	Batch file implemented after transmission of :QZU:
QZD-RX.BAT	Batch file implemented after receipt of :QZD:
QZD-TX.BAT	Batch file implemented after transmission of :QZD:

Each LAN-LINK user must configure the QZ*.BAT files for their systems. The port number in the batch file should be set to the PC I/O Port used. The data rate in the batch file should be set to the data rate used between the PC and the TNC, NOT the data rate used on the radio link.

For example,

the default QZU-RX.BAT file of

```
'pcz 1 1200 rz %1'
```

should be changed to

```
'pcz 2 1200 rz %1'
```

if you have interfaced your TNC to Port 2 on your PC, and if, the baud rate between the TNC is 2400 baud, the file should be changed to

```
'pcz 2 2400 rz %1'
```

Each of the four batch files have to be customized for each user who is not using PC Port Com1 and 1200 baud between the PC and their TNC.

Summary

The flexibility offered by the Zmodem protocol has many advantages when used in a packet radio network. LAN-LINK 1.59 implements Zmodem by the use of an external public domain protocol package which provides for the maximum degree of user customization. This capability is provided at the cost of having the individual user customize four batch files using the text editor built into LAN-LINK. ☐



(Cont'd from page 17)

out made some improvement. Also try to keep the cables that connect between the system unit and the peripherals short to under 8.5 ft. if possible because 8.5 ft. is near quarter wave length on 1OM. This can make the ground at the peripheral not the same ground potential as at the system unit at the higher HF frequencies.

I also checked the grounding out in the PK232 I have and found that the screws that hold the printed circuit board to the metal chassis were not tight. This caused Pin #1 on the RS 232 connector to be floating above Ground and the metal chassis. Once the screws were tightened the noise from the TNC and computer seemed to go to a Greatly reduced value.

When the printer was on there was some noise from it and I again took the cover off and checked the Ground on the printed circuit board and found no screws that were loose, but the printer cable hood was not making very good contact and the noise would come and go. So I pushed the metal part of the hood together to tighten up the printer port connection on the computer side.

After careful inspection of both the keyboard and monitor, I grounded via a separate wire ground both the chassis of the keyboard and monitor to the chassis of the system unit. The keyboard and monitor noise is possibly from the long cables on both.

I did check the possibility of computer RFI from coming in through the AC power lines. I checked this out by connecting the FT757GX to a shielded dummy load while the computer was on. The results were that there was no noise. If there is noise present on your transceiver, I would recommend that using noise suppressing AC power strip will reduce this path of the computer RFI.

In further experimentation I have found that taking the low pass filter out which is connected between the antenna tuner and the FT757GX transceiver seemed to increase the noise level greatly. Normally a low pass filter is used to decrease harmonics from the transmitter but in this case it keeps the frequencies above 30 MHz out of the receiver. Also several different configurations and lengths of coax were used. The results were no change in the noise level. I thought that the low pass filter was just attenuating the signal enough to cut the noise out but as far as I could ascertain that there is no change in signal levels between having a low pass filter or not.

Antenna systems are an additional consideration. Using an indoor antenna would leave little if any isolation between the receiver and the computer. I have a 2M transceiver with an indoor antenna and an outdoor beam antenna. When I used the indoor antenna the computer noise does keep the squelch open even with the squelch all on. But using the outdoor beam antenna the receiver has normal squelch and does not receive the computer's noise. I could see additional isolation if one used a HF beam and tower. This could give up to 20dB isolation over a low dipole or a G5RV.

The bottom line in eliminating computer RFI is how much interference did all this work take care of. Well after all is said and done I have reduced the noise coming from the computer (at times S9+) so that now the only thing I hear is the background noise of the receiver on the 80, 40, 20 and 15M bands. On 1OM there is a little noise from the computer but the S-meter stays at S1 and does not affect the reception of HF packet. Eliminating RFI from computers is not easy and just doing one thing will not eliminate all the RFI, but doing all or more of the above will make it livable. □

*@Copyright 1988 by Lee Zalaznik, K160Y
Source: World Radio Magazine*

TexNet.

The crudest form of networking can be found in every TNC. It is called digipeating. (This form of networking is so crude that the stations are not usually referred to as network nodes.) One drawback to digipeating is that the list of link stations is limited to eight. Another drawback is that digipeaters do nothing but receive and retransmit the packet. Therefore the packet must make it through all digipeaters with no collisions. If there is a collision, the packet must start over from the originating station. This is referred to as end-to-end acknowledgment. (See Figure 1.)

Network nodes improve this situation by using node-to-node acknowledgment. (See Figure 2.) With this type of acknowledgment, the node receives the packet and sends an acknowledgment back to the previous node (or end user). Then it sends the packet to the next node. This node in turn sends an acknowledgment back to the previous node, and sends the packet to the next one. Now if there is a collision, the packet only needs to be resent between two nodes, instead of from the originating station. You can link as many nodes together as you like, although time delays and propagation will eventually create a limit for practical use.

Network nodes also allow packets to be received out-of-sequence. The AX.25 packet protocol allows for more than one packet of information to be sent at a time. If there is a problem with reception, such as poor propagation or a collision caused by channel congestion, I may receive packet number 2 and not receive packet number 1. When this happens the normal TNC must resend both packets because the TNC must receive the packets in order. A network node does not require that packets be received exactly in order. Instead it provides some means of storing the out-of-sequence packets, and requesting retransmission only of those not received. Packets are then sent to the end user in correct order.

The ideal network would be similar to the telephone system. When you want to call someone you pick up your phone and dial a number and the phone rings on the other end. You don't know what specific phone lines (or microwaves) were used to link your call to its end destination.

If you lived in San Francisco, and we had the ideal packet network, you would be able to connect to your friend in Washington D.C. using your 2-meter radio. All you would need to know is your local node for entry into the network, and your friends' local node for exit from the network. You would not know what specific radio links were used to get between the San Francisco node and the D.C. node.

What is a Packet Network?

by Gloria Medcalf, KA5ZTX

A packet network is a group of stations that can be linked together to reach a distant point. Depending on how advanced the network is, the linking may take place manually or automatically. Each station in the network is called a node. The hardware for a node consists of at least a TNC, a radio, an antenna, and associated cables and power supplies. A multi-port node may have more than one TNC and/or radio. Depending on the type of node, a computer may also be present.

The instructions that the node uses to determine how to operate is called a program and

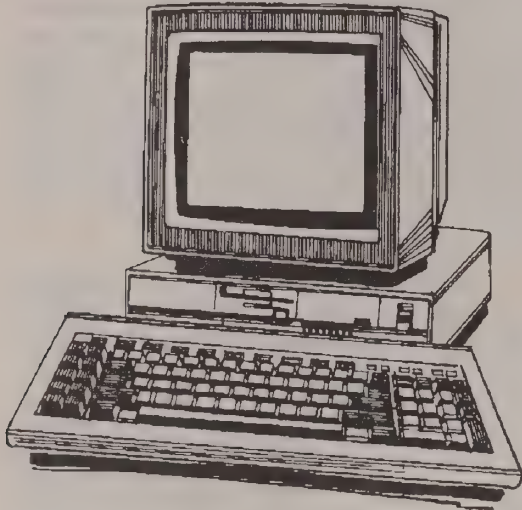
may be either in a computer or in a chip inside the TNC. When instructions are in a chip they may be referred to as firmware; in a computer they may be referred to as software.

Since amateur packet radio began, amateurs have been searching for the ideal network program. Currently there are several in use around the world, with none being standard. Some programs are compatible and will automatically link to each other, while others must be linked manually to be used together. Some names of the current popular programs are: Net/Rom, TheNet, G8BPQ Packet Switch, Rose,

(cont'd on page 21)



More On Portables



Last issue's IBM Arena covered a wide variety of topics that I hope you found of interest. In this issue's column, I'd like to continue to pass along information on advances in portable PCs. Clearly, portable PCs are an increasingly important segment of the IBM compatible marketplace, and hardly a month goes by without a significant advance in the field.

Since I last reported to you on portable PCs, the market has shifted. Today, compact, light 286 based machines with hard drives and a floppy as well as VGA displays are the common denominator, replacing the 8086 based machines that lacked hard drives and high resolution displays at about the same price. The 12 March 1991 issue of PC Magazine contains another comprehensive review of portable PCs.

This time around, PC Magazine's divisions for portables is as follows:

- Lightweight 8086s
- 286 Notebooks
- 386 and 386SX laptops
- AC powered 386 portables

As I'll soon explain, 8086 based portables no longer make economic sense - unless you get a good buy on one.

Also, the 18 March 1991 issue of Business Week has growth in the laptop PC market as its cover story. An interesting point raised by the Business Week article is that neither IBM nor Apple have had a successful portable computer. IBM's Convertible was a flop, with its PCjr like wedges that attached to the rear of the machine to add options adding to the size and weight of the machine. In 1889, 570,000 laptop computers were sold. The number jumped to 832,000 in 1990, and is expect to rise to 1,800,000 by 1992.

Today's laptop PC should have the following features to be considered seriously for purchase:

- 80286 or 386SX processor
- 20 Mb+ hard drive
- 1.44 Mb floppy
- VGA backlit LCD display
- 1 to 5 Mb RAM
- 7 lbs or less
- notebook size
- 3 hour battery life
- Built-in ports and modem
- selling price of about \$2,000 for base system

There are currently several such systems on the market that are doing very well. The first that comes to mind is the Zeos Notebook (1-800-423-5891) which sells for \$1995 with a 286 processor and \$2295 with a 386SX. Another popular model, although more expensive, is the Texas Instruments TravelMate at a retail price of \$3999. The CompuAdd Companion is a nice laptop at \$2895 but lacks a built-in 1.44 Mb floppy

In the 386SX category, the Compaq LTE/386 is a good but pricy selection. More in line with the budget are the Dell portables, the 316LT and 320LT, 16 MHz and 20 MHz 386SX machines. But unless your laptop will also serve as your main PC, you're probably better off with a 286 for most purposes.

The key when selecting a laptop PC is to identify your needs. There's no sense in paying for more than you need, but at the same time make sure you get the most for your money. At this time, the 286 laptops offer the best price/performance with the Zeos leading the pack.

I've covered amateur radio applications of portable PCs thoroughly in earlier columns, so I won't repeat them here. But let me restate that a portable PC can add a great deal to your capabilities. If you rely on a desktop PC at home or at the office, you should seriously consider a laptop - especially if you travel.

My first laptop was a TRS-80 Model 100; in fact, it's probably still one of the best laptops available even though it's six years old. However, since most of the latest software is written for the IBM PC, the Model 100 is limited in what it can do. A portable IBM, on the other hand, can run just about everything that will run on a desktop. This means that you can use the same software and accessories that you use in the shack while operating remotely.

PC Journals

In the November/December 1990 IBM Arena column, I introduced a new feature called PC Journals. In this section, which I plan to periodically run in this column, I advise you of a PC related serial publication that I think you should know about and possibly consider subscribing to. In this column, I'd like to give you the run down on Byte magazine.

Not many people know that Byte magazine was originally founded by Wayne Green of 73 Magazine fame. Today though, it's a McGraw-Hill publication. Byte is not a IBM PC exclusive magazine. Rather, their strength is in covering the entire microcomputer field, mostly PCs and Macs. They cover a wide variety of related topics, from hardware reviews to software evaluations, networking to tutorials. In fact, Byte's published a few amateur radio related articles on packet radio over the years.

Byte is home to Jerry Pournelle's User's Column - a Byte staple that I've enjoyed over the years. Byte is a great way to keep up with what's going on in the microcomputer field. Byte is published monthly an additional special issue in October. You can find Byte on most any newsstand, or you can subscribe for \$29.95 a year (BYTE subscriptions, PO Box 551, Highstown, NJ, 08520) although you may be able to subscribe for less through special offers.

Conclusion

Portable PCs are an important development in IBM PC compatible computing. Since they're advancing so fast, it can be difficult to decide when to purchase one. After all, the one you buy will cost less in a month or two and a new version will probably be out within six months. My advise is to decide what you need in a portable and what you're willing to spend. When you find a suitable portable, buy it and use it.

Feel free to contact me with any comments, questions, or suggestions. I prefer E-mail to CompuServe 72276,2276 or Prodigy SCSD46C.

Be
Exceptional...

Be an
Amateur Radio Operator!

for more information write:
National Amateur Radio
Association,
16541 Redmond Way, Suite 232
Redmond WA 98052
CALL 1-800-GOT-2-HAM



(Cont'd from page 19)

Today this sounds like a fantasy, but it does happen over smaller distances. For instance, I can tell my local node in Lawrence Kansas to connect to a node in Wichita and on a good night I might be successful.

Automatic linking is what makes this all happen. The network nodes have some system of remembering how to get to a destination. They may even be able to reroute if a node in the middle gets hit by lightning and goes off the air. Different programs use different systems, but usually you can manually link between systems.

A factor that affects the ability to link for long distances is the speed of the network. The slower the rate of data transmission, the longer it takes to get from one place to another. Also, since packet is a store and forward mode, each node takes time to receive and time to transmit. So, the more nodes used, the more time needed.

There are many 1200 baud stations in existence today because that has been the standard. As higher speeds become available

everyone is not going to change their stations at the same time. Dual-port nodes can offer a linkage between speeds. For example: If I am in Lawrence and want to talk to Topeka, I can connect to KSLAW at 1200 baud. When I tell KSLAW to link to KSTPK, they link at 9600 baud. Then when I connect to another user in Topeka, KSTPK connects to him at 1200 baud.

Nodes arranged in this manner begin to develop into a backbone. A backbone is a system of nodes capable of linking to each other, preferably on a different frequency and at a higher speed than the users. Let's look at Figure 3 as an example. For our example we'll say KA5ZTX wants to talk to WK5M. So, KA5ZTX issues a connection that says she wants to enter the backbone at KSLAW, and she wants to exit the backbone at KSBLC, then she wants to connect to WK5M. All she needs to know is her entry and exit points to the backbone. The nodes take care of getting inbetween them. In this case KSLAW would connect to KSTPK, who would connect to KSBLC; all automatically on the backbone frequency.

Getting the node-to-node traffic off the user frequency reduces the congestion on the user

frequency, which reduces collisions and speeds communications. Likewise, the node frequency only has node-to-node linking traffic and is not congested with local traffic. A dual-port node like this can be easily done with a dual-port TNC, or by wiring two single-port TNCs together. The network node programs are written to accommodate this situation.

Since packet is a store and forward mode, each link reduces the speed of the entire connection. If the speed of the backbone is increased, users can still enter the network at 1200 baud, but be linked at greater speeds; thereby lengthening the distance of a useful connection. □

About the Author

Gloria Medcalf KA5ZTX was first licensed in May, 1986 and received her General class license in August of 1986. She served on the Emergency Communications Support Team in Houston, Texas and was assigned as one of the primary packet operators for the Emergency Operations Center.

She has been actively involved in packet since first licensed, and now lives in Lawrence, Kansas with her husband Karl WK5M. She has been involved with helping to establish the Kansas Packet backbone system, which currently is running 9600 baud and will soon be upgraded to 19.2 Kbaud. Gloria also has written a book on MS-DOS for Packet Users (Kantronics Press) which serves as a basic introduction for new packet users. She is also co-sysop of the 4-port Packet BBS station operating in Lawrence, KS, using WORLI software and G8BPQ node software.

She is self employed in the typesetting industry, and does all the major manuals and publications for Kantronics Company.

FIGURE 1. End-to-End Acknowledgment

When a collision occurs, the packet must restart from the originating station.

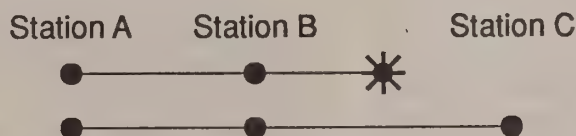


FIGURE 2. Node-to-Node Acknowledgment

When a collision occurs, the packet needs to only be resent from the previous node.

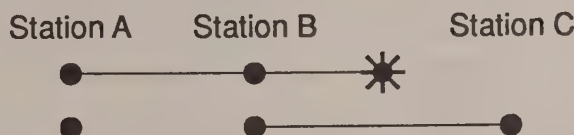
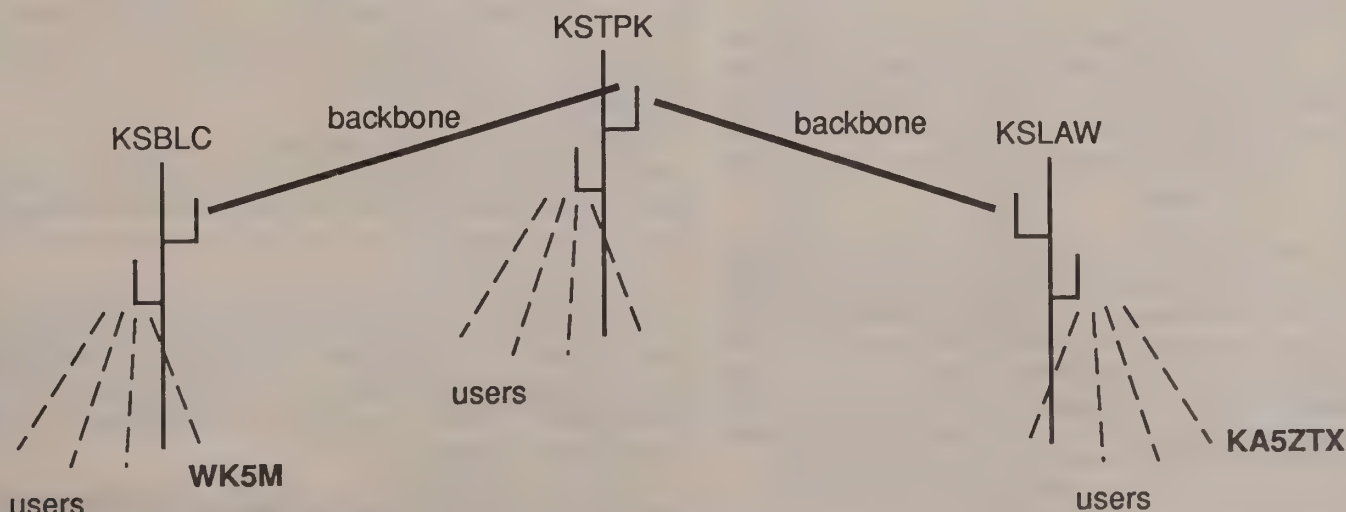
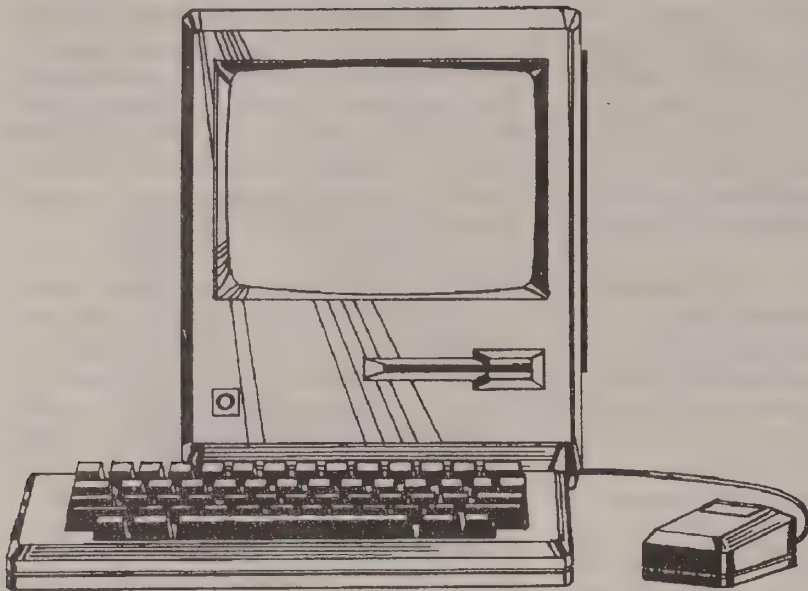


FIGURE 3. Network Backbone





The Mother of All Ham Radio Software Bargains

I'm late again with this column. I had good intentions of finishing it during the weekend. I left Tom Arvo a message on CompuServe that he would have it by the end of the weekend. Here it is Wednesday and I am still writing the damned thing. Arvo must think I have god-awful long weekends.

I do have a legitimate excuse. First, my wife threw a birthday party for me and, after I recovered from that, I caught a god-awful head cold and all the drugs in the world couldn't get me to write something legible until now . . . I think.

Anyway, I've been playing with TCP/IP software on my Mac for a bunch of months and I like it a lot. Phil Karn, KA9Q, wrote the original TCP/IP software package a few years ago for computers using MS-DOS (Microsoft Dinosaur Operating System). Since then, various programmers have ported Phil's code to other computers including the Atari, Amiga and Mac. Dewayne Hendricks, WA8DZP, and Doug Thom, N6OYU, wrote "NET/Mac", the Macintosh version of KA9Q's TCP/IP package.

Back Up . . . What's TCP/IP?

TCP/IP is the acronym for Transmission Control Protocol/Internet Protocol, which are a set of procedures that the Defense Advanced Research Projects Agency developed originally to permit dissimilar computers to communicate with each other over hard wire lines. KA9Q rewrote the protocols so that they could be used over the airwaves in the amateur packet-radio mode.

TCP/IP provides three primary user functions: the Simple Mail Transport Protocol (SMTP), the File Transport Protocol (FTP) and Telnet. SMTP performs the automatic sending of mail between stations, while FTP provides the means of transferring files between stations. Telnet is the protocol that allows stations to communicate with each other in real-time, i.e., keyboard-to-keyboard operation. Yes, AX.25 packet radio offers something similar to SMTP, FTP and Telnet, but TCP/IP allows you to do them simultaneously!

And There's More!

To make TCP/IP life easier, Bdale Garbee, N3EUA, wrote a utility, "Bdale's Mailer" or simply "BM," to manage the mail SMTP'd between you and other stations. The utility allows you to read, write, print, save, delete, and administer your SMTP mail.

Dan Frank, W9NK, added another dimension to the KA9Q package. He wrote code based on the NET/ROM protocol that allows a TCP/IP station to act as NET/ROM node.

TCP/IP has a provision that permits you to shift gears and communicate with AX.25 stations. Not only that, but the TCP/IP package includes an AX.25 mailbox function that allows AX.25 stations to leave mail at your station. What's more, BM accesses the AX.25 mailbox mail as well as your TCP/IP SMTP mail.

A word of explanation is in order here. When I say "AX.25 station," I mean a packet-radio station that is using the protocol built into its TNC, i.e., the AX.25 protocol, as opposed to the TCP/IP protocol running on a computer. TCP/IP still requires you to use a TNC, but that TNC is practically brain-dead. To cripple your TNC's brain for TCP/IP operation, it must support the KISS (keep it simple, stupid) mode and KISS must be turned on. (All TNCs that are compatible with TAPR AX.25 Version 1.1.6 or later, support the KISS mode. Most TNCs that don't support the KISS mode, can be upgraded to do so. Contact your TNC's manufacturer to find out how.) By turning KISS on, you disable most of the intelligence in your TNC. What you have remaining is a modem and a bare-bones AX.25 packet assembler and disassembler (PAD). The TCP/IP software running in your computer now performs all of the higher-level functions.

If you have been following this train of thought, you may have noticed that TCP/IP stations actually use the AX.25 protocol. The TCP/IP packets flying through the air are being transported by AX.25 packets. The reason for this is to conform with FCC regulations that require that packet radio use AX.25 in the FCC's domain, i.e., over the air. So, in truth, stations using TCP/IP are "AX.25 stations," too.

While I am on the subject of what you need . . . besides the TCP/IP software and a KISS-mode TNC, you will require an IP address. The IP address is a unique identification for every "node" on the TCP/IP network. Each computer is a "node," so if you have two or more computers on the network, you will need two or more IP addresses.

The IP address is a 12-digit number that is divided into quadrants that are separated with periods (e.g., 044.088.000.014). To simplify matters, most TCP/IP'ers delete the leading zeroes in the IP address, thus, 044.088.000.014 becomes 44.88.0.14. You obtain an IP address from your local IP address coordinator (consult the accompanying side-bar for the IP address coordinator for your area).

TCP/IP On The Mac

NET/Mac is a good implementation of the KA9Q TCP/IP package. It is very Mac-like. For example, if you are running multiple TCP/IP applications, separate windows open automatically for each application. Each window may be resized and moved around the screen as you wish.

NET/Mac also is compatible with MultiFinder and continues to run in the background, while another application is running in the foreground. This permits me to run NET/Mac on a 24-hour basis without interfering with other applications I need to use. For example, as I write this column using Nisus, NET/Mac is running in the background SMTP'ing messages I created earlier.

If you have two or more Macs networked together via AppleTalk, you can use AppleTalk from a remote Mac to communicate over the airwaves via



the Mac connected to a TNC and radio equipment. The only requirement is that each Mac in the network needs its own unique IP address and has to run a copy of NET/Mac.

Other unique features of NET/Mac are a help function, support of MacBinary II file transfers via FTP and the ability to use more than one disk drive to store FTP'able files. And the price is right! NET/Mac is almost free. If you are on Internet, you can FTP a copy from apple.com, or via telephone, you can download a copy from N8EMR's BBS at 614-895-2553 or from CompuServe's HamNet. The software may be on other systems and BBSs as well, but you'll have to find them yourself. Otherwise, you can send \$5 for a copy to Doug Thom, N6OYU, c/o Tetherless Access Ltd., 1405 Graywood Dr., San Jose, CA 95129-4778. If you FTP or download the software, make sure you also FTP/download "NET/BM" and the TCP/IP documentation.

Whether you send \$5 to N6OYU or spend \$5 downloading the software over the telephone, TCP/IP is the biggest bargain in Amateur Radio software today. (Commercial TCP/IP packages cost hundreds of dollars more.) TCP/IP takes packet radio many steps beyond what plain vanilla AX.25 can do and its cost is negligible. It's almost painless, so, why not try it. ☐

IP ADDRESS COORDINATORS

UNITED STATES

State	Coordinator
AK	John Stannard, KL7JL
AL	Ken Adkisson, WB4FAY
AR	Richard Duncan, WD5B
AZ	David Dodell, WB7TPY
CA (Los Angeles and S F Valley)	Don Jacob, WB5EKU
CA (Orange County)	Brian Roode, KA6CCF
CA (Sacramento)	Bob Meyer, K6RTV
CA (San Bernardino and Riverside)	Geoffrey Joy, KE6QH
CA (San Diego)	Brian Kantor, WB6CYT
CA (Santa Barbara/Ventura)	Don Jacob, WB5EKU
CA (Silicon Valley & San Francisco)	Douglas Thom, N6OYU
CO (Colorado Springs)	Bdale Garbee, N3EUA
CO (northeast)	Bill Flynn, AI0C
CO (west)	Bob Ludtke, K9MWM
CT	Jon Bloom, KE3Z
DC	Don Bennett, K4NGC
FL	Garry Paxinos*
GA	Doug Drye, KD4NC
HI and Pacific Islands	John Shalamskas, KJ9U
IA	Ron Breitwisch, KC0OX
ID	Steven King, KD7RO
IL	Ken Stritzel, WA8AEK
IN	Jacques Kubley,
KA9FJS	
KS	Troy Majors, WI0R
KY	Bob Austin, N4CLH
LA	James Dugal, N5KNX
MA (central, east and Cape Cod)	Don Hughes, KA1MF
MA (west)	Rolfe Tessem, W3VH
MD	Howard Leadmon,
WB3FFV	
ME	Jon Andrews, WA2YVL
MI (lower peninsula)	Jeff King, WB8WKA
MI (upper peninsula)	Pat Davis, KD9UU

MN	Gary Sharp, WD0HEB
MO	William Simmons, WB0ROT
MS	Phil Akers, WA4DDE
MT	Steven Elwood, N7GXP
NC	James Curran, KA4OJN
ND	Steven Elwood, N7GXP
NE	Mike Nickolaus, NF0N
NH	Gary Grebus, K8LT
NJ (north)	Dave Trulli, NN2Z
NJ (south)	John Pearce, WB2MNF
NM	J Gary Bender, WS5N
NV	Earl Petersen, KF7TI
NY (ENY ARRL Section)	Bob Bellini, N2IGU
NY (NYC-LI ARRL Section)	Jim Metcalf, NQ2D
NY (WNY ARRL Section)	Devon Bowen, KA2NRC
OH	Gary Sanders, N8EMR
OK	Joe Buswell, K5JB
OR	Ron Henderson, WA7TAS
PA (eastern)	John Gayman, WA3WBU
PA (western)	Bob Hoffman, N3CVL
PR	Karl Wagner, KP4QG
RI	Charlie Green, W1CG
SC	Mike Abbott, N4QXV
SD	Steven Elwood, N7GXP
TN	Jeff Pierce, WD4NMQ
TX (central)	Kurt Freiburger, WB5BBW
TX (Dallas)	Don Adkins, KD5QN
TX (west)	Rod Huckabay, KA5EJX
UT	Jeff Jacobsen, WA7MBL
VA (not DC)	Jim Dearthas, WA4ONG
VT	Ralph Stetson, KD1R
WA (east)	Steven King, KD7RO
WA (northwest, Portland, Vancouver)	Tom Kloos, WS7S
WA (west, Puget Sound)	Clifford Neuman, N1DMM
WI	Pat Davis, KD9UU
WV	Rich Clemens, KB8AOB
WY	Reid Fletcher, WB7CJO

INTERNATIONAL

Country	Coordinator	Country	Coordinator
Argentina	LU7ABF	Indonesia	YB1BG
Australia	VK2ZXQ	Ireland	EI9GL
Austria	OE1YSS	Israel	4X6OJ
Belgium	ON7LE	Italy	I2KFX
Canada	VE3GYQ	Japan	JG1SLY and JH3XCU
Central America	TI3DJT	Luxembourg	LX1YZ
Chile	CE6EZB	Norway	LA4JL
Cyprus	5B4TX	Phillipines	DU1UJ
Denmark	OZ1EUI	Portugal	CT1DIA
Ecuador	HC5K	South Africa	ZS6BHD
Finland	OH1MQK	Spain	EA4DQX
France	FC1BQP	Sweden	SM0RGV
Germany	DL4TA	Switzerland	HB9CAT
Greece	SV1IW	Thailand	HS1JC
Holland	PA0GRI	United Kingdom	G4CLI
Hong Kong	VS6EL	Venezuela	OA4KO/YV5
Hungary	HA5DI	Yugoslavia	YU3FK

Outer Space-AMSAT

Tom Clark, W3IWI

* no call sign yet; home address: 3868 NW 21st Ct, Coconut Creek, FL 33066 ☐



(Cont'd from page 7)

country, compared to International Telegraph Alphabet Number 2. Here are some of the main points of divergence.

In ITA#2, the following characters are reserved for each nation's government administration to decide what they mean and what they will do in service:

FIGURES F
FIGURES G
FIGURES H

These characters are NEVER (repeat NEVER) used in international commercial Baudot/Murray traffic. Each government has the right to assign various functions to these upper-case characters as they see fit. In most countries, Figs F, Figs G and Figs H print certain language characters that don't exist in English, but which must be made available in the local tongue. Examples are:

Figs H (pound or numbers sign) - upper-case 3 on the U.S. ASCII Keyboard is the Spanish Enyay, the letter 'N' with the little thing over it.

Figs G (ampersand) - upper-case 7 on U.S. ASCII keyboards, is the Portuguese c-cedilla, the letter c with the little curlyque under it.

There are a number of other conflicts, such as the inversion between FIGURES J and FIGURES S, reversing the bell and the apostrophe.

The ITA#2 keyboard has many differences, none of which are subtle. Let us list them so you can print them out for reference. It's a lot cheaper than buying a copy of the CCITT books that have them all.

CHARACTER	U.S. Keyboard	ITA#2 Keyboard
FIGURES D	Dollar sign	Answerback request (WRU)
FIGURES Z	Quotation mark	Plus sign (+)
FIGURES J	Apostrophe	Bell
FIGURES F	Exclamation point	Varies with country
FIGURES G	Ampersand	Varies with country
FIGURES H	Pound sign	Varies with country

Each nation assigns FIGS F, FIGS G and FIGS H as needed without regard to other countries. That's why they are never used in international traffic in TTY, either radio, cable or telex. In addition, because the American quotation mark does not exist in ITA2, the correct solution is to use two apostrophes (") in place of a quotation mark.

Now maybe you can understand why DXers might be confused seeing your name all neatly flanked by plus signs on his page, or even on his screen, if his microprocessor-based terminal does indeed correctly translate ITA#2 for him.

The key to the continued widespread use of the Baudot/Murray code is twofold.

1. For the vast majority of national and international business traffic, the 32 Baudot/Murray character combinations are all that are required. Most of the international commercial traffic is plain text, without need for control characters, formfeeds, tabs, etc., and other characters and feature found in the ASCII code. As businesses find a need for increased flexibility in the data being handled, they will gradually change over to other data communications methods with ASCII for the additional code characters. But this will take a few more years to happen.

2. The Baudot/Murray code uses five information bits, compared to ASCII's seven bits. This means than line for line, circuit for circuit, on a world-wide basis, and given the variable conditions of noise and line qualities, systems operating with Baudot/Murray code generally show a substantially lower data error rate than that provided by ASCII. The purely mathematical values prove that ASCII offers at least two, and sometimes three, additional chances for error in each character, as compared to Baudot/Murray code. Only one bit has to get bombed to render the whole character invalid. It's that simple!

The electromechanical teleprinter has been around since it was originally conceived and patented in 1855 by David E. Hughes, an English music professor, and perfected by his French

partner, Gustave Froment. Its principle was simple, relating a continuously rotating wheel, an electromagnet, a clutch mechanism, and a moving strip of paper, to a piano keyboard. The code itself was invented by Emile Baudot, an officer of the French Telegraph Service. He introduced the five-unit code, in which each letter of the alphabet is represented by a special combination of five elements. Baudot's system was first introduced in 1874 and officially adopted by the French Telegraph Service in 1877.

The mechanical teleprinter as we know it today was designed and patented in 1894 by Hoffman in Austria, and perfected by John Morton in 1907, using the inventions of Charles Krum. They founded the Morkrum Company and sold the Morkrum Printing Telegraph Machine. Today you know that company as the Teletype Corporation of America.

Here are a couple of additional thoughts on the subject of why the Baudot/Murray code deserves more credit than some people give it.

If you need to transmit a text file that does not require any of the code characters unique to the ASCII character set and can settle for upper-case characters only, using only the standard punctuations, you may find your equipment capable of a really greater throughput rate with Baudot/Murray code rather than ASCII.

Try this experiment:

1. Get a fox generator or terminal equipped to handle both ASCII and Baudot at speeds up to 150 bauds.
2. With a stop watch, measure the amount of fox message characters and the lines of the fox message that can be sent in 60 seconds.
3. Divide the total number of Baudot characters sent by the total number of ASCII characters sent, to obtain a percentage difference.

Here are the the results obtained at the W2JUP "Laboratorie Fuer Rechnung Die Datenuebertragungsgeschwindigkeit":

Code	Time in Seconds	Number of Characters Sent
Baudot	60	1131 characters at 150 Bauds
ASCII	60	870 characters at 150 Bauds

What does this mean in your real world??

Well first of all, both ASCII and Baudot/Murray codes are used in the commercial world at 150 Bauds - that is a standard speed for certain kinds of message channels.

Second, not all of the radio modems (terminal

(Cont'd on page 26)

OUR 23RD YEAR!

SERVING SPECIALIZED COMMUNICATORS

6
ISSUES PER
YEAR

SAMPLE
ISSUE
\$3.50



48-56
PAGES
PER
ISSUE!

FULL COVERAGE FSTV, SSTV, FAX,
RTTY, PACKET, TVRO, SATELLITES,
MICROWAVE AND COMPUTERS

THE SPEC-COM JOURNAL

Official Publication of
The UNITED STATES ATV SOCIETY

\$20.00 USA \$25.00 CANADA \$30.00 DX



Office (319) 557-8791

Facsimile (319) 399-5918

Computer BBS (319) 582-3235

P.O. Box 1002

Dubuque, Iowa 52004-1002



COMPUTERIZE YOUR SHACK

Control up to eight digital radios simultaneously from your MS-DOS microcomputer! We offer a series of software/hardware package that interface with most current synthesized rigs.

ICOM: IC-781, 765, 761, 751A, 735, 725, R71A, R7000, R9000, 271, 471, 1271, 275, 375, 475, 575, CI-V
KENWOOD: TS-940, 440, 140, R-5000, 680, 711, 811
YAesu: FT-767, 757 GXII, 757 GX, 747, 9600, 736
JRC: NRD 525
COLLINS: 651 S1

ICOM
DEALER

Datacom couldn't be simpler. Knowledge of MS-DOS is not necessary—the installation program does it all! Datacom allows complete control of your rig from the keyboard.

A few of its many features:

- Adds scan function to radios that don't allow this from front panel.
- Adds frequency and associated info memory limited only by disk storage.
- Tabular screen display of all the channels stored in memory, along with a full description of each including: mode (LSB, USB, FM, etc.), eight character alphanumeric description, signal bandwidth.
- Full featured logging utility.
- Able to automatically log hits while sweeping.
- Color coded program for ease of use (will run on a monochrome system).
- Menus for amateur, AM-FM broadcast, television broadcast, S/W, aviation, marine, with most popular frequencies stored.

Call or Write today for more information

AVAILABLE FOR IBM PC, XT, AT, 80386 256K RAM 1 SERIAL PORT AND 1 FLOPPY MINIMUM

PROGRAM WITH INITIAL LIBRARIES.....\$99.95
RS-232 TO TTL INTERFACE (NEEDED IF DON'T HAVE MFRS INTERFACE)
EXTERNAL INTERFACE ALLOWS 4 RADIOS (NOW WITH
SQUELCH DETECT CIRCUITRY.....\$129.95
INTERNAL PC INTERFACE W/1 SERIAL & 1 RADIO PORT.....\$129.95
SPECTRUM ANALYZER MODULE.....(CALL FOR PRICE)
COMPLETE SYSTEMS INCL. RADIO, INTERFACE COMPUTER
AVAILABLE.....(CALL FOR PRICE)

Order direct or from Universal Radio 800-431-3939, Gilfer Shortwave 800-GILFER-1

7678 Venetian St. • Miramar, FL 33023

DATACOM, INT.

Orders: (800) 780-9505
Info: (305) 987-9505

500,000 Radio Amateur Call Signs at Your Fingertips

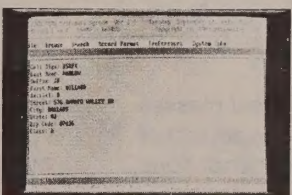
Introducing Buckmaster's
HamCall on CD-ROM

From Here

Over 500,000 call signs in the U.S. and possessions are available, searchable by call sign, name, address, city, state, Zip code or license class. Using CD-ROM optical disc technology and your microcomputer, you have instantaneous access to the Buckmaster HamCall data base.



To Here



\$499.95 per Package
plus Shipping (Quantities Limited)

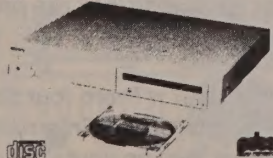
HamCall on CD-ROM is a package that includes the CD-ROM data disc, a Sony CDU-6100 external CD-ROM drive with interface card for IBM PC/AT type computers,* and MS-DOS CD-ROM extensions software.

Publishers Data Service Corporation's new Questar™ retrieval software package is also supplied. This retrieval system enables the user to search the CD-ROM data quickly and efficiently.

Instantly!

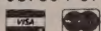
Order by calling 1-800-282-5628

SONY.



BUCKMASTER

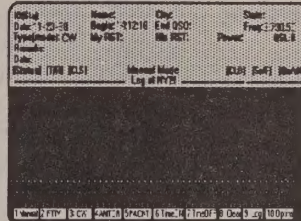
"Whitehall" Rte. 3, Box 56
Mineral, Virginia 23117
703-894-5777



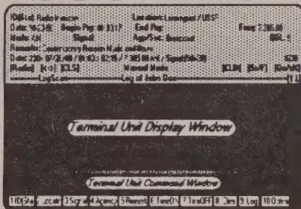
*Requires 640k RAM, hard disk drive and MS-DOS 3.1 or later version.

CIRCLE 140 ON READER SERVICE CARD

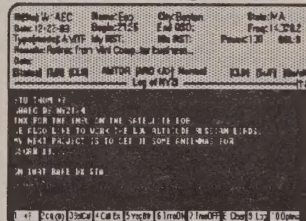
ARIES - 1



SCORPIO



ARIES - 2



BEARING

-- BEARING --
BEAM HEADING & RANGE
FROM YOUR QTH

Integrated Multi-Function Communications Software for IBM PCs

- ☐ **ARIES-1** (Log, Control TU, Read Radio Data) \$64.95
- ☐ **ARIES-2** (Log, Control TU, Read & Control Radio) \$89.95
- ☐ **SCORPIO** (Unparalleled SWL / Monitoring control) \$89.95
- ☐ **BEARING** (Up-to-date and User modifiable) \$29.95

> Includes Printed Manual > **SCORPIO** also includes "Top 100 HF Frequencies" database
> Mouse and/or Function Key control of Terminal Units & most newer Radios
> Search Log by any field including Remarks > Scan Radio based on a Log Search
> Print DIGITAL signals to the screen or a file even while scanning > **MUCH MORE!!**

Call or Write for Complete Specifications

MasterCard

Include Call Sign w/order - add \$5.00 S&H

Visa

ash-ton

PO Box 830 - Dandridge, TN 37725 - (615-397-0742)
Compuserve # 72557, 3560



(Cont'd from page 24)

units) found in amateur radio today can successfully demodulate speeds greater than 150 Bauds. That seems to be the upper limit of error-free copy for many of them, including some units sold as allegedly capable of copying up to 300 Bauds.

Assume that you wish to send a text file of 5000 bytes (characters) and your file contains only standard upper-case alphanumeric characters for data, and that the Baudot/Murray code contains all of the characters that you need.

Assume also that it's Sunday afternoon and you want to send this file to one of the busier radio bulletin boards or MSO systems around town.

Sending in ASCII at 110 Bauds takes 7 minutes, 51 seconds.

Sending in ASCII at 150 Bauds takes 5 minutes, 45 seconds.

Sending in Baudot at 150 Bauds takes 4 minutes, 42 seconds.

How does that grab ya, sports fans???

Here are the facts as I measured them:

110 Baud ASCII sends: 634 characters per minute.

150 Baud ASCII sends: 870 characters per minute.

150 Baud Baudot sends: 1130 characters per minute.

It's only the facts, ma'am... only the facts...

So the next time the resident expert tells you that Baudot is too slow and is obsolete, try that one for size.

Remember - ASCII must send a minimum of seven bits to define any character. Baudot/Murray code needs only five bits to define the identity of the character.

If you don't require those characters unique to ASCII, Baudot/Murray code will be faster at the same nominal data rate. In addition, the probabilities are high that under marginal signal path conditions, the error rate in Baudot will be noticeably lower than that found in ASCII.

Thoughts for the day for telepeople...

I'd like to let you all in on a wee secret (in my own pompous and verbose fashion) - the topic is 'THE QUICK BROWN FOX.'

There is really only one internationally accepted standard fox test message. Oddly enough, when you spend a lot of time on TTY, and use HF TTY, you get to see one humongous bunch

of silliness sent as FOX messages. The original purpose of the QBF test was to provide a test text to exercise each printing character in an electromechanical teleprinter. The true FOX text does just that and nothing else. In addition to testing each alphabetical character, each numeric digit is exercised.

The 'RY' test was originally intended to create the worst-case condition for an electromechanical teleprinter by forcing it to correctly decode and print a square-wave signal at the operating data rate. The RY sequence is simply a string of polarity reversed-pulses, equivalent to a square wave whose frequency equals one-half the operating speed. For example, if you want to test the machine at 45.45 Bauds (60 WPM), you would send it a square wave at a frequency of 22.7 Hertz. The RY was also the best way of setting the 'range-finders' that were the means of making the machine synchronize correctly over a relatively wide range of speed errors.

Note that the RY test would be meaningless in the ASCII code! "RY" does NOT represent polarity reversals in the ASCII code. For the same test effect, you would use an alternating sequence of upper-case 'U' and '*'. Those characters produce the same effect in ASCII.

In addition, when operating AMTOR Mode B, FEC (Forward Error Correction), your RYs will actually prevent the distant station from acquiring synchronization from your master clock. The RYs may give the distant station an excellent pattern to tune for with whatever tuning indicator is employed. But unfortunately, the poor guy will never sync to your clock, and therefore, although properly tuned in to your signals, no valid data characters will be transferred to the distant station.

Both the RY and U* tests are really meaningless in testing a microprocessor-based terminal. Reversals mean zilch to a micro. That's where the fox test comes into the story.

For the general information of the great masses out there in Radioland, here is the exact test of the fox test as set forth in the recommendations of the CCITT:

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE

That's all there is...they ain't no mo!! If you buy a commercial FOX test ROM (they DO exist and are cheap), you can have it made with your call sign or other special stuff burnt into the sequence after the 'DE.' Many commercial telegraphy operating centers use the end fill after 'DE' for station identification.

Here are some samples of fox tests I have collected over the years...

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE W2JUP NYK
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE NORM W2JUP
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE UPI NY
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE AFP PARIS
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE WUI NYK
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE TRT MIAMI
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE TASS MVA
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE ITT NYK
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE EBTL RIO
And so forth and so on...

The business of putting in the thing about the dog's back is some kind of red-neck invention...it ain't "in the book".

There is one other internationally standardized text used in place of the FOX. The message is in French and goes like this:

VOYEZ LE BRICK GEANT QUE J'EXAMINE PRES DU WHARF 1234567890 DE

There's actually another version for use with International Alphabet Number 5 (ASCII):

VOYEZ LE BRICK GEANT QUE J'EXAMINE PRES DU WHARF 123 456 7890 -X: \$ ()

The last character string after the digits 1 through 9 needs clarification. It varies depending on what kind of a terminal, what kind of a keyboard you are using. Here is how it actually lists:

- + plus sign
- minus sign
- * multiplication sign
- : colon
- = equals sign
- international currency symbol
- % percent sign
- () open/closed parenthesis

If you are running a true ASCII keyboard with the full ASCII character set, the test texts will be modified by the first and last letters of each word being in upper case, while the remaining letters are in lower case.

I know this is a hobby, but what's wrong with having the page or the screen look like professional traffic????

Keep the faith, you all!!!! (Them four things wuz exclamation points on my international keyboard. What were they on yours???) Free lunch to the funniest character translation...☐



(Cont'd from page 15)

cast. Then it is up to the users to "build" their routes, which to me is even more useless. I will never take a step backwards to that mess again. When I changed all my nodes to Rose I got all kinds of squawks because no one knew how to use Rose. Once everyone got educated, there was lots of praise for making things easier, the directory assistance switches got even more praise for having all the network info at the users finger tips!

All I can say to you nodeops out there is don't be afraid of change or afraid of losing users because "they are going to get off of packet" because they hate learning something new. Let 'em go, they'll be back. I got the same responses when I put in Netrom, "all that garbage your station is transmitting is messing up my screen", etc, etc. Everyone learned to cope with it and it is easier to cope with Rose since it doesn't have all the overhead and "garbage" transmissions Netrom/Thenet has. If it wasn't for guys like you and I trying to keep updated on technology we would still be digipeating and people like Tom Moulton and his group wouldn't be bothering with us hams, but would be concentrating on commercial ventures. Lets keep up with change. Its for the better. They need nodeops like us to help test and debug this stuff, just like the BBS software writers, and it benefits all in the long run.

I hope this article inspires some second thoughts to some of you, if you're getting bored with the same old stuff give Rose a try. The only thing I ask is to put up at least three and see how much easier connects can be. The more switches, and the further you go, the better it will look compared to the old way of getting around. A single switch doesn't show any benefits. My first connect into Alabama was a big surprise. I could never have done it with Netrom because of having to build my path. By the time I got near my destination Netrom/Thenet node would timeout and dump me while I was waiting for the next "connected to..." message in my journey of node hopping. So sit back and let the network do all the work, isn't that the way its supposed to be!? The Rose software is available on most landline BBS's, like WA6RDH @ 1-916-678-1535. or from the RATS group at the following address:

Radio Amateur Telecommunications Society, 206 North Vivyan St., Bergenfield, NJ 07621 USA

I probably missed something, but I'll leave that for you to find out. I covered the majority of it. 73 for now and good luck - Bruce. ☐

Submitted by Bruce LaPointe / WD4HIM

Digital Digest is published bi-monthly on, or about the 25th of the first month's issue date.

Opinions expressed are those of the article's author and not necessarily those of Digital Digest. The publisher assumes no responsibility for errors or omissions and assumes no liability for same.

All original material not attributed to another source is copyright ©1991 by the publisher:
ARVO COMMUNICATIONS, INC.
- All Rights Reserved -

- SUBSCRIPTION RATES -

\$16.00 U.S. / \$24.00 Other
Single Copy: \$3.00 U.S. / \$4.50 Other

Back Issues are available in limited supply from the publisher at \$2.50 per copy or may be ordered in complete volumes on microfiche from Buckmaster Publishing (see ad).

All subscription orders payable in U.S. Funds ONLY.

Subscription orders should be mailed to:

Digital Digest

4063 N. Goldenrod Road • Winter Park, FL 32792
TEL: (407) 671-0185 / Fax: (407) 671-0194
CompuServe I.D.# 73330,1335

The purpose of the Digest is to provide useful and timely information on all modes and aspects of amateur digital communications, computers, software and related technologies.

Please submit

letters, articles, club newsletters, and other editorial material to:
Digital Digest (Ed. Dept.)
4063 N. Goldenrod Road
Winter Park, Florida 32792

Get Connected With

DIGITAL DIGEST

Please fill out and mail with payment (U.S. Funds: Check or Money Order): **\$16.00 U.S. / \$24.00 Foreign**
Please check if NEW ☐ RENEWAL ☐

Name _____

Address _____

City _____ State _____ Zip _____

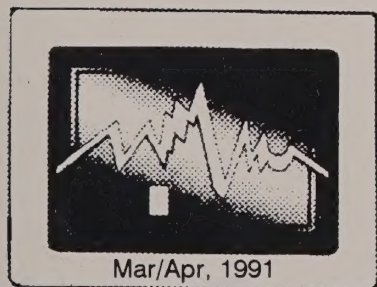
Favorite Modes _____

Special Interests _____

Ham Station (Gear) _____

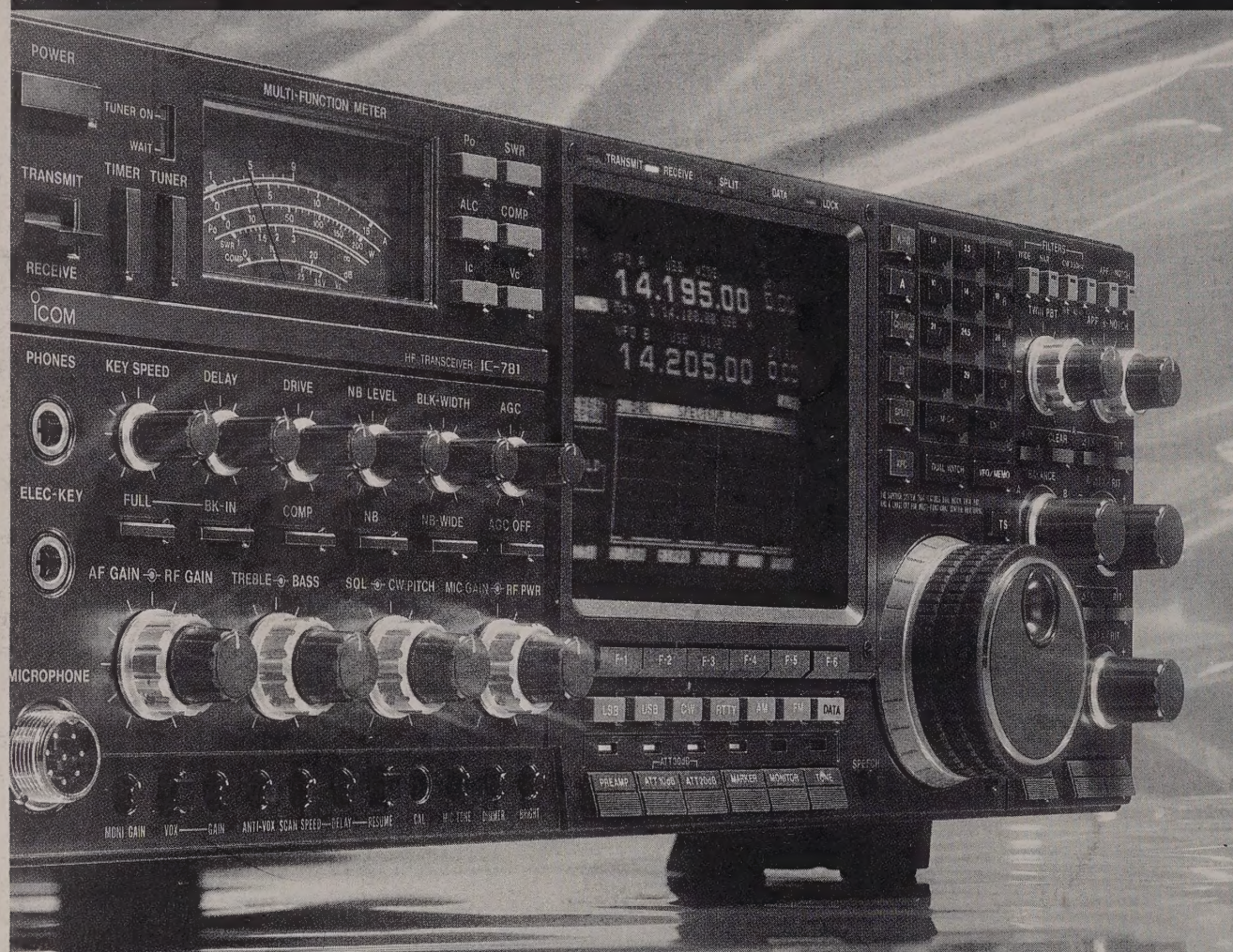
Occupation _____

Please mail to: Digital Digest • 4063 N. Goldenrod Road, Winter Park, FL 32792



THE LAST WORD IN PERFORMANCE

THE ICOM
IC-781
HF TRANSCEIVER



Nothing compares to the captivating experience of operating the finest transceiver on the market, the IC-781. The exhilaration of operating the IC-781 is matched only by the luxury of its crystal clear communications.

Designed for rigorous operation, the IC-781 is the result of extreme dedication, exceptional craftsmanship and precision engineering. The IC-781 fuses the perfect blend of features such as driving power, incredible clarity, a Multi-Function CRT Display, Spectrum Scope and Icom's exclusive DDS System to achieve unbeatable HF operation worldwide.

Whether you aspire to DX, contest or enjoy legendary performance, the IC-781 inspires countless hours of devoted attention. Backed by a service commitment second to none, four factory service centers and a one-year factory warranty, the IC-781 characterizes Icom's dedication to excellence.

For full details call the Icom Brochure Hotline at 1-800-999-9877.

CORPORATE HEADQUARTERS:
ICOM America, Inc., 2380-116th Ave. N.E., Bellevue, WA 98004
CUSTOMER SERVICE HOTLINE (206) 454-7619
CUSTOMER SERVICE CENTERS: 3150 Premier Drive, Suite 126, Irving, TX 75063
1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349
3071 75 Road, Unit 9, Richmond, B.C. V6X 2T4 Canada
2380-116th Ave. N.E., Bellevue, WA 98004

All stated specifications are subject to change without notice or obligation.
All ICOM radios significantly exceed FCC regulations limiting spurious emissions. 7811190

ICOM
First In Communications